

# (a very) SPECIAL ANNIVERSARY ISSUE!

**COOP'S  
SATELLITE  
DIGEST**



OCTOBER 01, 1984

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## TOP OF THE MONTH

**IT ALL** began innocently enough. A technical challenge. Curiosity. "The same reason men climb Mount Everest." Satellite TV? "Because it was there!"

**AND** so, five years after the 'formal' beginnings of our industry, here we are ripping along at 30,000 or so home TVROs per month with TVRO dishes as small as 4 feet in diameter installed on rooftops and in backyards and sideyards all over North America.

**THIS** special issue of **CSD** is a 'reflection' of all that we have done in those five years. Well, **maybe not all**, but certainly those events which we believe have special significance in shaping 'the way we are,' or more importantly, in laying the foundation for 'the way we **will be**.'

**SO** much has happened in those five years that a totally complete (and totally accurate) 'reflection' would properly fill a 1,000 page book. Only the truly dedicated would find it interesting, or amusing. We have attempted to strike a balance with this 'Fifth Birthday Issue' of CSD, someplace between 'relevant' and 'boring,' 'important' and 'mundane.' Doubtless, there will be some 'gaps' in our historical perspective and some events of importance are missing. But the 'flavor' of the birth of an important industry is, we feel, present in our 12 'chapters' and we believe you will find the chronology useful.

**INDEED**, this is **your** industry and **you cannot ignore** all that has happened in the past any more than you will be able to 'duck' that which will happen in the future. This is the 'world of TVRO'; **welcome to it!**

## OCTOBER 1984

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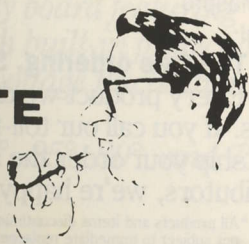


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**OUR COVER/ A BIG BITE.** TVRO Pioneer **David Brough**, active building home and community TVRO systems long before October 18, 1979 takes the 'big bite.' His **Commander** brand TVRO dish, appropriately decorated as a birthday cake, was more than five years 'in the oven' (see **Correspondence** section, this issue). Immediately following this photo session, Brough cornered the Ontario market for Bromo Seltzer.

## COOP'S SATELLITE DIGEST



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Word of mouth advertising from customers can make you or break you. So make sure you get compliments—not complaints—with BR's exclusive "Futureproof"™ five-year warranty. It's the first opportunity for TVRO customers to buy an extended protection plan for their systems at the time of purchase, just like they buy for their cars.

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### Immediate Free Replacement Service.

*BR Satellite is the only distributor in this industry who will replace any defective TVRO product with a new unit, just by making one toll-free phone call. Before you send the defective unit back and at no cost to you.*

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If you've got it, flaunt it! The "Futureproof" warranty sticker in your store window could be your best salesman. We'll send brochures and in-store displays, too.



### Our Standard Warranty—Still the Ultimate, Still Free.

Every piece of equipment we sell is backed by our unconditional replacement policy for a full year.\*

It's an irresistible sales tool, and it won't cost you or your customers a cent.

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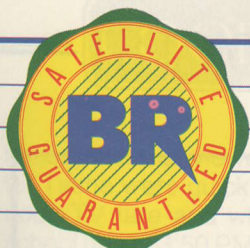
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**BR SATELLITE** is the only distributor in this industry who will replace any defective TVRO product with a new unit. We'll ship a replacement via UPS Blue Label, at our expense, the same day you call us.

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Quiet quality, for better pictures even on today's smaller dishes. Degree for degree, dollar for dollar, the Norsat is simply the quietest, most efficient LNA ever made.

*Unique all GaAsFet four stage design (no bi-polars) with min. 51 db gain.*

*Total weatherproofing—precision milled recessed top cover; computer-milled aluminum body.*

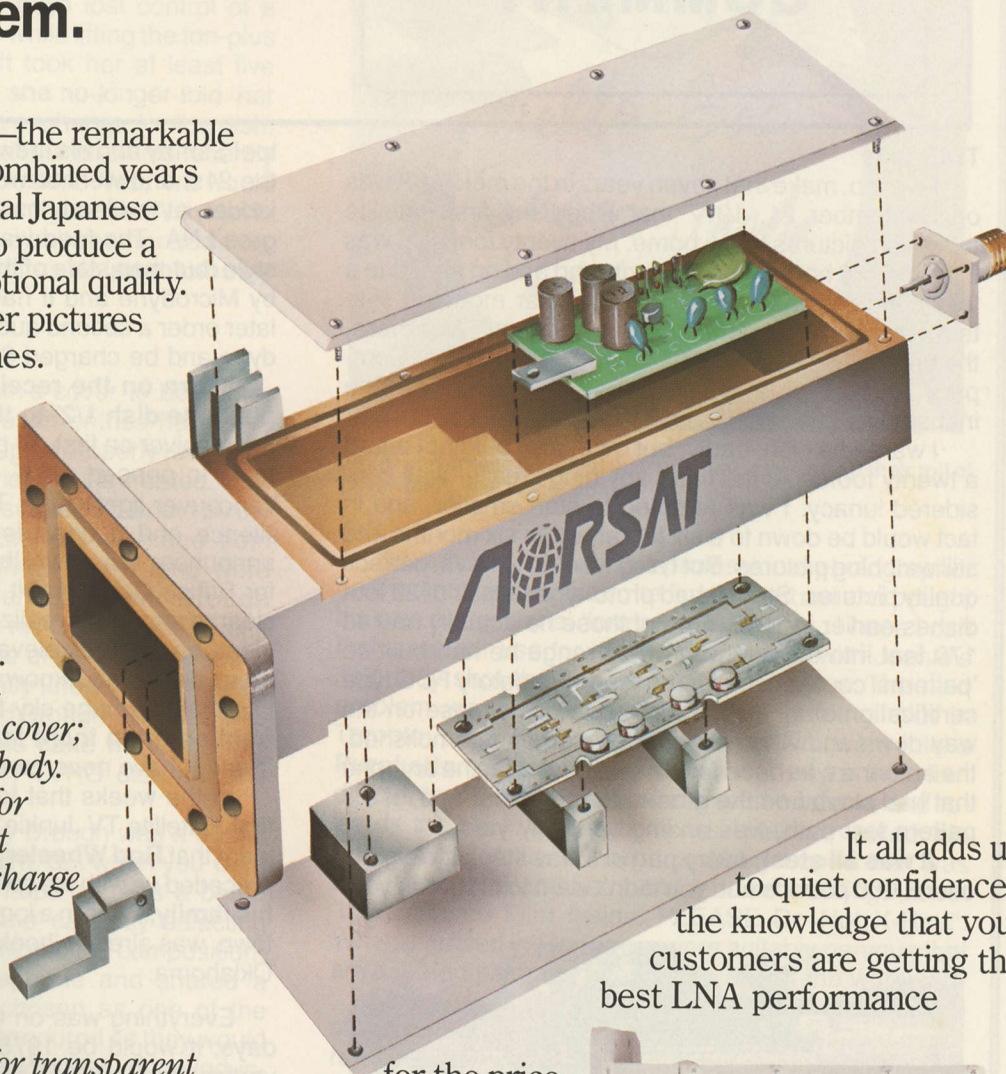
*Grounded input probe for maximum protection against failures due to lightning discharge or high ambient RF fields.*

*Triple sealed and ruggedly mounted type "N" output connector.*

*Low VSWR resonator for transparent impedance match into the first GaAsFet stage.*

*Separate power supply board featuring ultra-stable regulation with built-in protection against polarity reversal, voltage fluctuation, and static discharge.*

*Available in 100°, 90°, 85°, 80°, and 75° noise temperatures.*



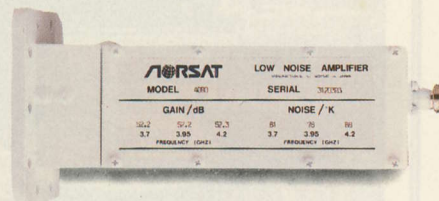
It all adds up to quiet confidence—the knowledge that your customers are getting the best LNA performance

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## "We Distribute Trust."

Dealers Only.

**NORSAT**



## COOP'S SATELLITE COMMENT

- SEVEN Years In The Making
- WHO DID It First/'First'?
- STORY Of A Unique Cover

### THIS Is It

Five, no, make that seven years in the making. It was on September 21, 1977 that I had my first satellite television pictures in my home. My twenty foot dish was installed in 8 hours; from bare ground and no mount to a fully concrete-padded twenty foot polar mounted system. That was the genius of one **'Stormy' Weathers**, the bright guy behind USTC/United States Tower Company; an early creator of TVRO antennas for the cable industry.

I wanted a dish, badly; but certainly could not afford a twenty footer. At the time, anything smaller was considered lunacy. I was tempted to start smaller, and in fact would be down to a six footer within six months and still watching pictures. But I also wanted to have 'perfect' quality pictures. Stormy had proto-typed a pair of 20 foot dishes earlier in 1977. One of those he actually hauled 170 feet into the air (!) on a test range he had built so 'patterns' could be run for the then-mandatory FCC type certification of all dishes. That one came loose on the way down and when it hit the ground and demolished, the antenna was done for. The second one, the antenna that had stayed on the ground for the 'other end' of the pattern test path, was ending up in my yard.

**It was all steel;** every part of it was steel. It weighed over 3,000 pounds and you didn't want to drop it on your

toe! Stormy and his crew arrived early on the morning of the 21st and went to work. By 7 PM he was on a step ladder, at the feed, installing my precious SCI 180 degree LNA. The feed was brazed brass; one of the old style (but then state of the art) 'horns.' The receiver was by Microdyne and it had only 6.8 MHz audio. I would later order a second audio board (6.2 MHz) from Microdyne and be charged \$550 for it(!).

**"Turn on the receiver,"** instructed Stormy, **"and push the dish 1/2" to the west."** We did both, turning the receiver on first. At precisely 1/2" of antenna movement in popped ANIK. The early evening news from Vancouver lighted our TV screen and there was total silence and a considerable amount of awe as the announcer ran down the day's temperature extremes for British Columbia. It was days later when my head cleared enough to realize that Stormy had not only been 'dead on' with his elevation and his north-south alignment, he had also known exactly where to point the dish into that big, huge sky to find ANIK. **Precisely, to the fraction of an inch!** In the seven years that have followed, I have never seen **anybody** else do 'that trick.'

In the weeks that followed, my family became the first 'Satellite TV Junkie' family in the USA. I would later learn that **Rod Wheeler**, up in the Yukon in Canada, had preceded us with his own terminal by a month or so, and **his family**, living in a log cabin 15 miles from the nearest town, was already 'hooked' when we turned on down in Oklahoma.

Everything was on horizontal polarization in those days; it would be 1978 before anything came up on vertical and I would be faced with 'that' problem. There were never more than 10 video channels up, on all of the birds, at a time and HBO was the only premium service as was WTCG (now WTBS) the only fulltime service. We moved the dish by using raw strength to position 3,000 pounds of steel. Fortunately, Stormy had designed it so it was capable of being moved by my then-8-year-old Kevin although he did have some difficulty unclasp the 'safety catch' on the boat-trailer 'ball' we used to tie the dish down once moved.

We did all of the 'usual' things, first; making (BETA) tape dubs of movies for our friends, rushing out to buy a big-screen projection set, wiring up the house with a MATV/SMATV system so the satellite channel (6 in our



**THERE GOES** the pine tree (right, center)! USTC's crew prepares to lift the 20 footer into position for Coop's first terminal. **YES,** that is a 6 footer on the ground in front. We were ready even in August of 1977!



house) could be viewed in any room. Son Kevin, daughter Tasha were quickly 'hooked' on Ted Turner's afternoon TV fare and when they climbed down from the school bus at 3:50 PM, they immediately headed to their bedrooms to watch **My Three Sons** or some other Turner sitcom; often with a half dozen neighbor kids in tow.

**They were great days;** tremendous fun, and very exciting. Susan lost a favorite 'pine tree' when the dish was installed; one of Stormy's guys lost control of a backhoe and ripped into the tree while lifting the ton-plus dish surface onto the mount. It took her at least five years to reach the point where she no longer told 'her story' of losing a favored tree in exchange for the dish. She, Kevin, Tasha and I talked about all of this recently and came to a unanimous conclusion; 'Yes,' we would do it all over again, if the opportunity arose. With Kevin now 15, and Tasha 12, that was a bellweather decision; there is very little that **all four** of us do **unanimously** agree on **anymore!**

## THE MAKING Of A Cover

I naturally wanted this month's cover to be something very special. More than a dozen 'entries' had come along in my mind since the concept of properly recognizing and celebrating our "5th Birthday" was created. Late in July I was zeroing in on what I suspected would be my ultimate choice when an Air Express package from Canada arrived. Inside were three (very) long word processor created letters from Canada's **David Brough** and a pair of 'press releases' for his Commander Satellite antenna firm. Attached to one of the press releases was a color photo which I instantly knew was the basis for **'the cover'** for October. David Brough, Pioneer, was eating a birthday cake. Only **this cake** was an 8 foot chocolate colored (Commander) TVRO dish and the frosting was shaving cream!

The original photo created by Brough was a 35MM 'snapshot.' We could use it, alright, but when you want to create a special cover, you hope there is a better product if you spend a little time carefully selecting everything from the film to the light and the composition.

I called Joanie on the telephone and shared a secret; (her) David had been chosen as one of the seven people to be honored (or honoured as they would spell it in Canada) as a 'founding Pioneer' of the industry. Could she manage to keep that a secret from David until the Birthday Party in Nashville on September 3rd?

Next I called David and told him of my desire to feature him and his 'unusual cake' on the October front cover; "would he mind re-shooting it with a professional 'format' camera?"

**He was willing** and Joanie, the artistically bent member of the dynamic duo, would redecorate a dish for the photo. We all especially liked the sub-reflector feed which Commander uses; a sort of 'candle' for the 'cake' and a perfect spot to highlight a '5' for our fifth year. Time, however, was running short. We had 72 hours to get the photo shot and the prints down to Fort Lauderdale.



DAVID and Joanie included this 'unusual' greeting on their roll of 'cover film'; well done, Joanie!

dale.

Brough found locating a professional photographer on short notice a problem; he finally went out and bought his own professional 'format' camera ("... I hope I can find a regular use for it **now!**") and then with Joanie's help they shot the sequence all over again. The next problem was rapid developing and printing. Not in Toronto; on a weekend! So the raw film went into a **PuroLetter** overnight bag and it headed for the often difficult trek through Canadian export customs and towards the USA. The outside was plainly marked 'No Commercial Value' (Brough probably hoped that was NOT the case!) and had hand lettered warnings about 'Undeveloped Film Inside/ PLEASE Do Not X-Ray!'. When it arrived in Florida we were suitably nervous that anyone had paid any attention to any of the warnings.

Obviously, it all worked out OK. We had a dozen shots to select from and the balloons Joanie had decorated the dish with blew in a number of interesting directions; including across the word Birthday! Selection was simply a matter of setting aside those where the balloon got in the way of the 'text' and then narrowing down the selection to the best views of Pioneer Brough.

With only two hours to spare, we turned the selected material into our color separation department and the cover was headed to your desk. Brough, meanwhile, will have a stock of shaving cream to carry him through the long Canadian winter ahead.

## FIRST First

There have been a number of significant "firsts" in this industry since it began and there are many fables



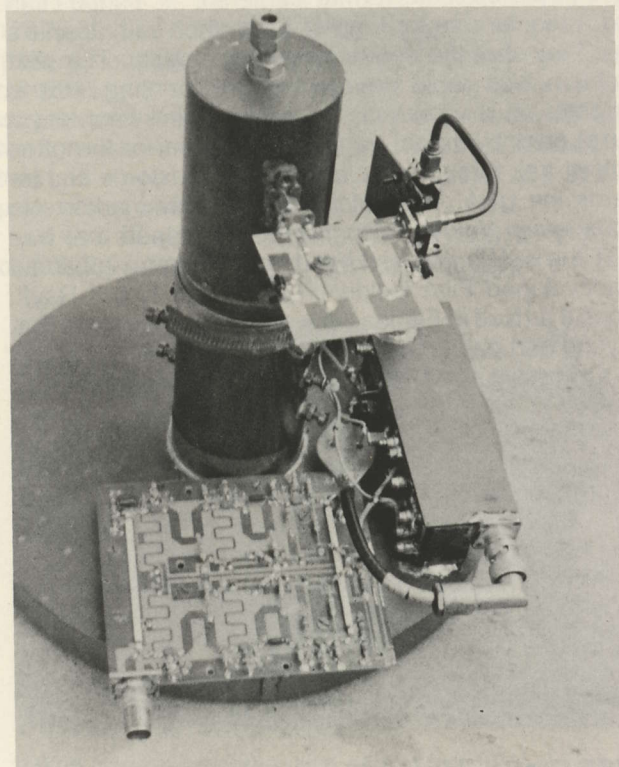
about who did what, first, and when. As a serious student and sometimes-participant in many of these firsts, I have attempted to report each as they occurred and for whatever value that may one day hold, there is a record of our industry since before there was an industry.

Because this special "77th Issue" of **CSD** is likely to be kept at the front of reference book shelves for many years, we thought it might be amusing to list some of the firsts and who was responsible for each. In that way, you can settle arguments by flipping to these pages and point with some authority to the listings here. Going back and tracing who did what, first, is a dangerous exercise. I'll make a blanket offer to correct this list **one time**, say on the occasion of our industry's sixth birthday, and then as far as I am concerned, the list is cast in stone. That gives you **11 months** to document your exceptions to what follows; frankly I don't expect many changes.

#### 'General Firsts'

The first to:

- 1) Build and install a private terminal; **Steve Birkill**, Sheffield, England in 1975 (note: This was an 890 MHz terminal, **not a microwave terminal**, using UHF satellite signals intended for India from the experimental ATS bird).
- 2) Install a private commercial terminal; **Arthur C. Clarke**, Colombo, Sri Lanka in 1975 (note: **Also done at 890 MHz**).
- 3) Build and install a private **4 GHz** terminal; **H.**



EARLY ('78) Birkill 4 GHz receiver had much of the microwave electronics mounted at the (flat plate) scalar feed.



FIRST Taylor Howard TVRO antenna was 'Navy Surplus' 15 foot screen mesh system originally mounted on board a vessel!

**Taylor Howard**, San Andreas, Ca.; July 1976.

- 4) Install a private 4 GHz terminal; **Rod Wheeler**, Yukon, Canada; July 1977.
- 5) Install a licensed (i.e. legal) private 4 GHz terminal; **Bob Cooper**, Arcadia, Ok.; September 1977.
- 6) Build a totally **homebrew** parabolic dish antenna for TVRO; **Rod Wheeler**, Yukon, Canada; July 1977.
- 7) Design and build a totally homebrew **4 GHz** receiver for a private, home system; **Steve Birkill**, Sheffield, England; 1978.
- 8) Demonstrate quality TV reception on a **10'** dish; **Bob Cooper**, Arcadia, Ok.; January 1978.
- 9) Demonstrate quality TV reception on a **6'** dish; **Bob Cooper**, Arcadia, Ok.; February 1978.
- 10) Design and build and offer for sale **TVRO receivers** for the private (home) marketplace; **Steve Richey**, **Rod Wheeler** in July 1978 (10 built and sold).
- 11) Publish an article extolling the advantages of a home TVRO in a national magazine, thereby creating widespread interest in TVRO; **TV GUIDE** Magazine, 10-21-78 (**Bob Cooper**).
- 12) Publicize on a national television program the advantages of a home TVRO, creating additional widespread interest in TVRO; Walter Cronkite **CBS Evening News**, 10-31-78 (**Bob Cooper**).
- 13) Publish a 'book' describing TVRO systems so the reader could assemble his/her own; **SATELLITE TV HANDBOOK**, March 1979 (**Bob Cooper**).
- 14) Publish a series of do-it-yourself manuals describing step-by-step creation of TVRO systems or subsections; **Howard** Terminal Manual, **Coleman** Terminal Manual, **Swan** Spherical Antenna Manual (8/79).
- 15) Hold an international TVRO technology conference (SPTS '79) with equipment displays, seminar sessions, demonstrations (Oklahoma City, Ok. Aug. 14-16, 1979; 505 attended, 8 exhibits).

COOP/ continues on page 171



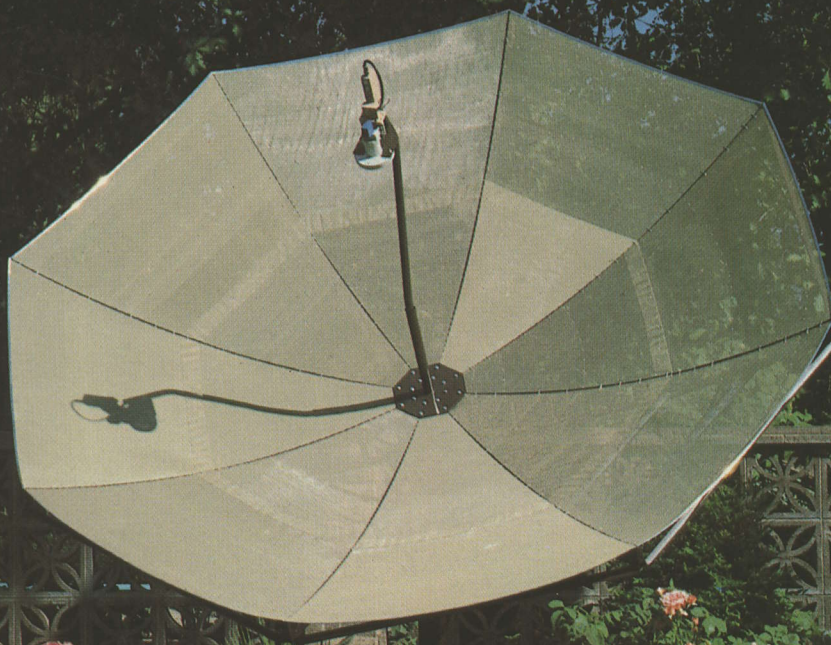
# Your Picture Window to the World

Owning a Paraclipse High Performance Satellite Television System will expand your communications capabilities far beyond the horizon. No longer will you be bound to the limitations imposed by conventional broadcast, terrestrial microwave or the local franchise cable service.

You will gain access to the most wide-ranging and versatile component of the present communications revolution; the North American geostationary

telecommunications satellite system. A Paraclipse system will bring you television from around the world.

Examine a satellite television guide and you will appreciate the incredible selection of programming that is available at the touch of a button, anytime. Satellite TV means more great Movies, Sports, Specials, Music, Educational, News, Weather, Childrens, Inspirational and Adult programs than you can imagine.



Paraclipse 3.8 meter

**Paraclipse**  
HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM

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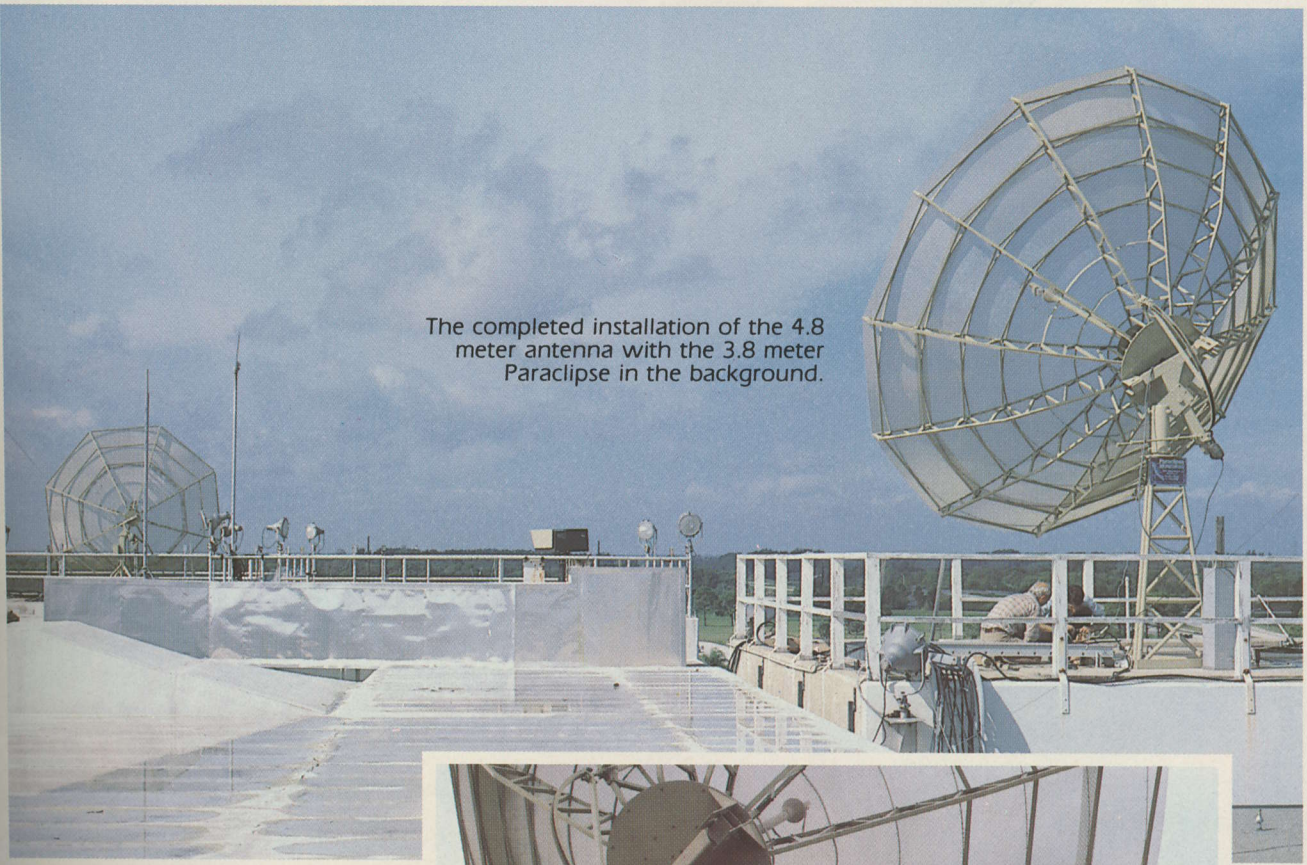
# KENNEDY SPACE CENTER

The Paraclipse 4.8 meter satellite antenna was installed atop NASA's Central Instrumentation Facility, at the Kennedy Space Center, November 1983. Paradigm engineer Gene Campbell (l.) and chief engineer Frank Casten (r.) assemble the superstructure using only simple hand tools and step ladders.





The completed installation of the 4.8 meter antenna with the 3.8 meter Paraclipse in the background.



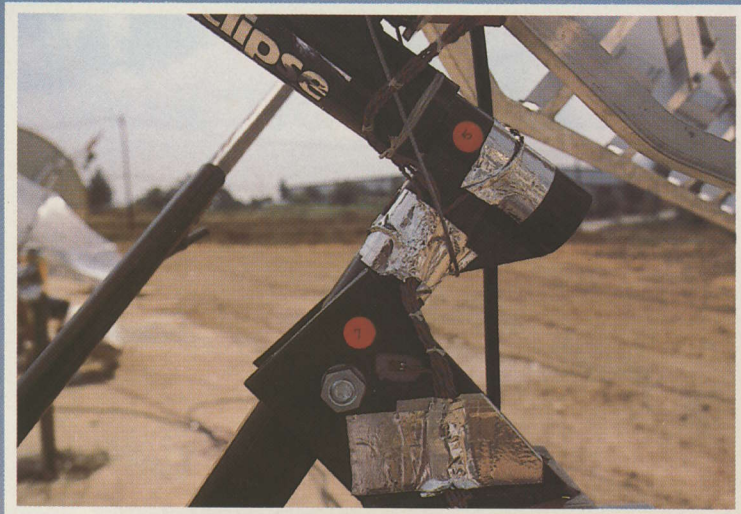
NASA engineers watch as Gene and Frank fine tune the 4.8 meter with a spectrum analyzer.



**Paraclipse**  
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# HURRICANE

Your new antenna is all set up, adjusted, fine tuned and the service technician is on his way back to the shop. Now the real test begins. Will it continue to perform? For how long will it maintain the picture quality it has today?

Your antenna will have to face the wind and weather every hour of every day of its life. This will be its toughest test. To survive, you'll need equipment strong enough to take whatever nature can throw at it. You'll need Paraclipse.

It is impossible to gather conclusive data about the effects of storm generated stress on an antenna unless you can control the storm. We wanted to put our equipment through an intense, concentrated weather test to measure its





PIONEER MEMBER OF  
**SPACE**

# Paraclipse

## HIGH PERFORMANCE SATELLITE TELEVISION SYSTEM

performance, so we hired a "professional hurricane" to see if we could break a Paraclipse.

We dumped 337 gallons of water per minute into a 95 mph windstream to create the wind load equivalent of a 140 mph storm. Each antenna was tested at five different elevation settings and was blasted from eight different angles.

After several hours of abuse, both Paraclipse antennas emerged undamaged and in perfect shape. Off-air satellite signal evaluation at the end of the tests, indicated the Paraclipse antennas maintained the same electrical parameters as prior to the tests. After testing, measurements show no warping or distortion of the welded aluminum truss structure or mount assembly. Both antennas, in spite of loads to which they were subjected, maintained parabolic symmetry and accuracy. Neither antenna suffered any damage; not one piece of mesh was bent or one clip lost. Both antennas were absolutely stock items assembled according to standard instructions.

The welded aluminum Rib & Ring Truss System pioneered by Paraclipse is still the lightest, strongest, most accurate design available. The concentric ring trusses, to which the heavy expanded aluminum mesh is fastened, form a perfect compound parabolic shape that even a hurricane can't bend. The all steel polar mount and base are powder coated to further seal and protect them from the elements.

A Paraclipse system has the structural strength and dimensional stability to maintain the integrity of its parabolic shape under the worst of conditions. Paraclipse materials are chosen for their lightweight strength and corrosion resistant properties. Every aspect of the Paraclipse design represents strength in performance.

Paraclipse, strong, lightweight, weatherproof, shippable, easily assembled with simple hand tools, an affordable quality antenna from a very reputable manufacturer.

Dollar for dollar, you just can't buy more performance.

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# Don't Try This Stunt At Home.



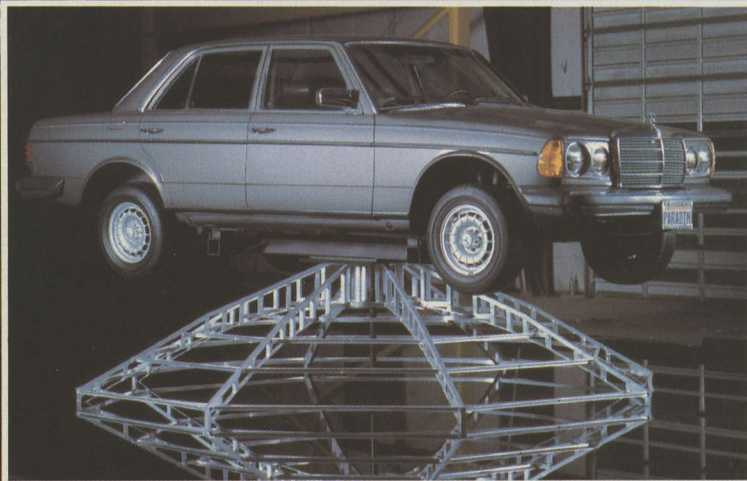
Mark Fator, photographer

This was fun. It was a lot of work too, but it was fun seeing if we could actually do it.

It began as a little sketch on the margin of a note pad, and after a great deal of thought and a huge amount of convincing — Mike loaned us his car.

We parked a real live Mercedes Benz 300D on top of an absolutely box-stock Paraclipse antenna.

The 3.8 meter Paraclipse was assembled meshless and placed face down in a shallow pool of water. We fabricated a special steel H-shaped



rack to provide a flat surface at the balance point. The car's forward weight bias was counter-balanced with 300 pounds of steel plate in the trunk.

The total dead weight was 4,522 pounds. Total deflection under load was 1 inch and when the whole ordeal was over, the hub plate was only .45" closer to the floor than before.

Last year, during a "destruction test," we dropped 5,200 pounds of steel stock on the same antenna; so we weren't really surprised when this stunt worked.

What does it prove? Just one thing: We build a very, very strong antenna.

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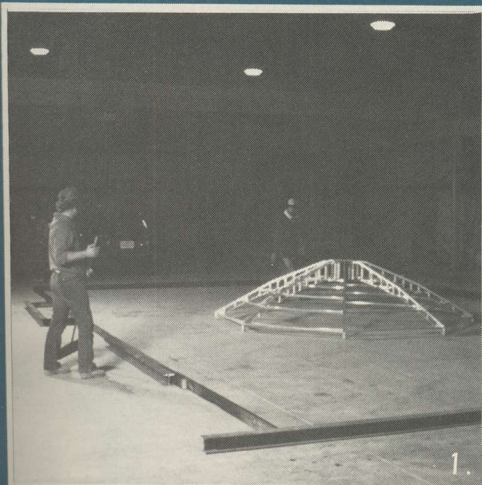
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# How We Did It.

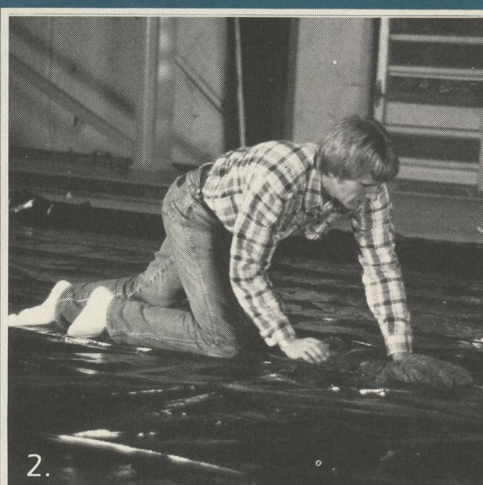


1. The reflective pool required a large open space. Steel I-beams and 2x4's formed the perimeter of the pool.

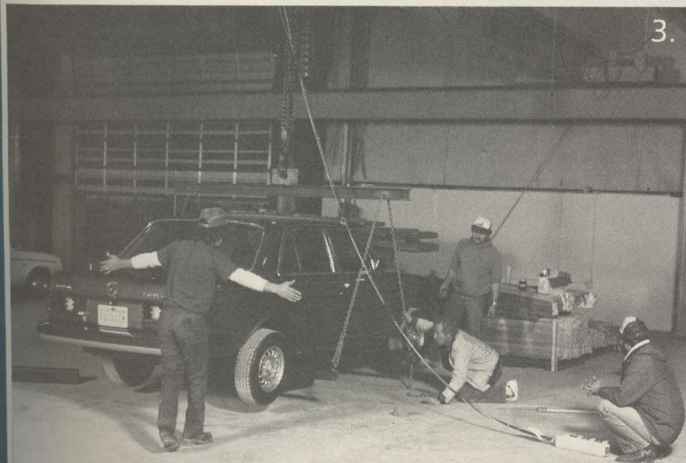
2. John Steven, marketing, cleans the seam between the two 50 ft. sheets of plastic that held the water for the reflective pool.

3. Gene Willyard, production manager, looks for the balance point while Raul Espitia, tool crib mechanic; directs the crane operator.

4. Mike Andrews, Paradigm V.P. and car owner, posed for one last shot prior to moving the car to the antenna.



2.



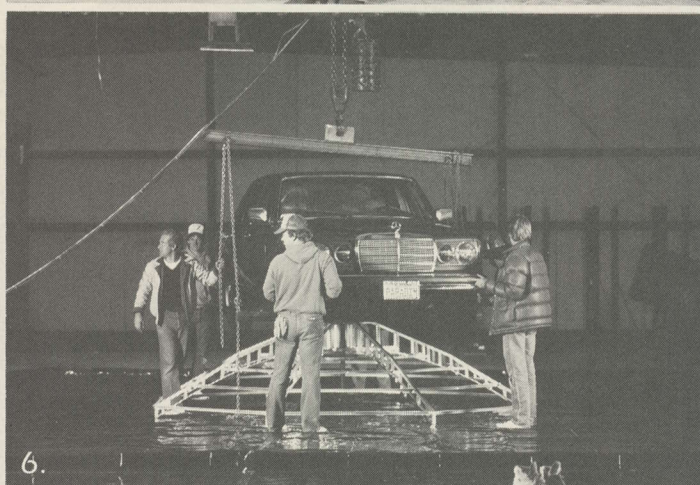
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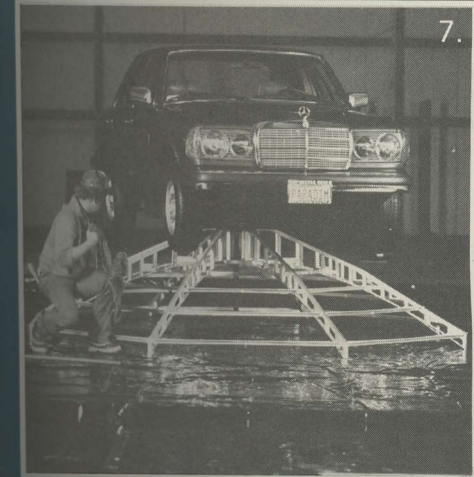
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5.



6.



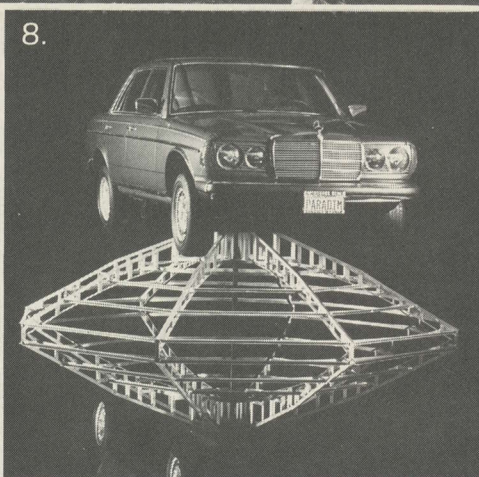
7.

5. The car is inched into place with Mike at the control switch, Gene and Raul steady the load.

6. With the full weight of the car resting on the antenna, we gingerly remove the steel tubes that were used to lift the H-rack. Left to right; Gene Willyard; Toby Elder, powder coating foreman; Bill Ulch and John Steven.

7. A final dusting before the water is turned on, 3½ hours later the car was on the ground.

8. That's how we did it. We don't recommend you try this stunt at home. It isn't for the faint-hearted or the ill-equipped.



8.

**Paradipse**  
HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM

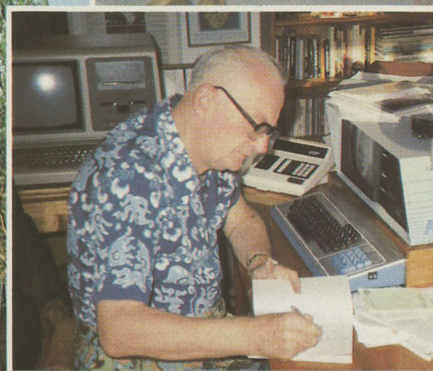


## Arthur C. Clarke: A Brilliant Prediction

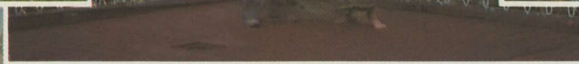
The 4.8 meter under construction.



Arthur Clarke in his study.



Arthur C. Clarke (r.) with David Johnson of Paradigm and the new 4.8 meter Paraclipse.



12 years before the launch of Sputnik, 17 years before the first communications satellite and some 30 years before the first experimental broadcast satellites, Arthur C. Clarke published his now famous technical paper in the British scientific journal *Wireless World*.

In his article titled "Extra Terrestrial Relays" Clarke described with near perfect precision the very same telecommunications satellite system we use today. For his brilliant theoretical work, Clarke has received awards and honors from all over the world. The Clarke Orbit Belt is named for him.

In November of 1983 an international group of 29 industry-related people lead by publisher Bob Cooper, traveled from all over the world to Colombo, Sri Lanka where Clarke lives.

For 4 years Bob had championed the idea of industry representatives donating their equipment and energies toward the building of a satellite earthstation at Arthur Clarke's home.

The response from the industry was so unanimous and overwhelming that the gesture soon grew to include two systems for the Arthur C. Clarke Center for Modern Technologies at the nearby university, in addition to the system for Mr. Clarke's home.

We at Paradigm Manufacturing feel especially proud about being asked to participate in the journey and at having our equipment chosen as the hardware to be installed at Arthur C. Clarke's home.

**Paraclipse**  
HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM



# Paraclipse

HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM



The Paraclipse 4.8 meter  
(16 ft.) antenna.

PIONEER MEMBER OF  
**SPACE**

## Survival of the Fittest

It's a tough world out there. Every minute of every day the effects of wind, rain, heat, cold and corrosion will do their best to defeat your investment.

If your system is to survive and perform accurately day after day, year after year, you will need to start out with equipment strong enough to endure nature's worst.

The famous Paraclipse design rib and ring truss system is simply unequalled in terms of rigidity, strength and parabolic symmetry.

The antenna framework is a precision welded aluminum alloy structure covered with heavy expanded aluminum mesh. The result is a strong, lightweight, dimensionally stable mesh reflector that is capable of supporting the kinds of loading that a solid dish would impose.

The hub assembly, polar drive,

pedestal mount and counterweight are all fabricated from steel. Precision tooling and manufacturing techniques enable the 4.8 meter Paraclipse to track from horizon to horizon and from zero to 90° elevation with perfect, dead center accuracy.

Our counterweight assembly offsets the forward weight bias imposed on the polar tracking mechanism. By placing a mass equal to that of the reflector behind the polar T, we've greatly reduced the demands placed on every component of the drive system. With the drive disconnected, the entire superstructure swings smoothly to the center position and can easily be moved by hand to any position in the arc.

Every part is powdercoated with a beautiful baked-on epoxy finish that effectively seals the antenna from the elements. The entire assembly is put

together with stainless steel bolts, nuts and fasteners.

We're so confident in the way we build the 4.8 meter Paraclipse that we guarantee it for three full years against wind damage. That's right, a three year unlimited wind speed warranty. If it is damaged by wind in the first three years, we fix it. You are protected right up to, but not including an officially declared disaster.\* We are that confident.

You will want your investment to last. You will want your equipment to perform. You will want accuracy and reliability for a long, long time. And you will want all of these things at a reasonable price from a manufacturer who will stand squarely behind his products.

At Paraclipse we think you deserve no less.

**Paraclipse Inc. 3711 Meadowview Drive, Redding, California 96002 (916) 365-9131 244-9300**

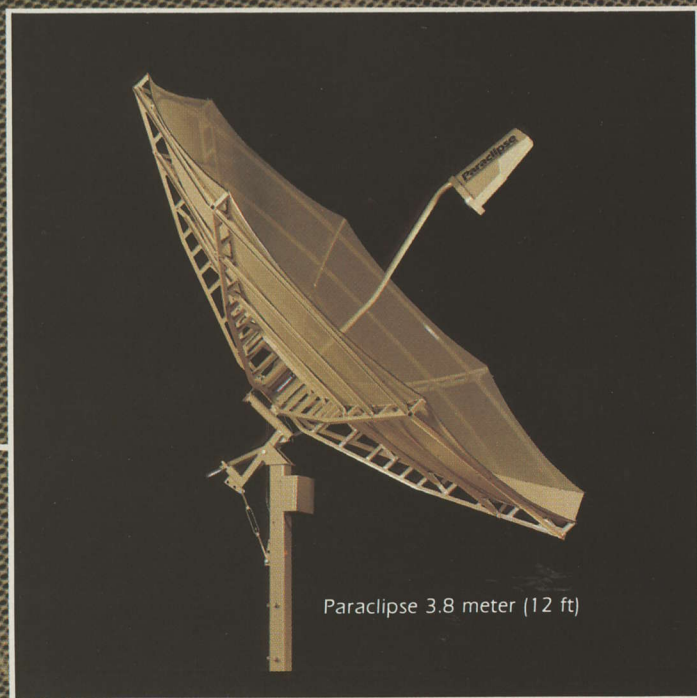
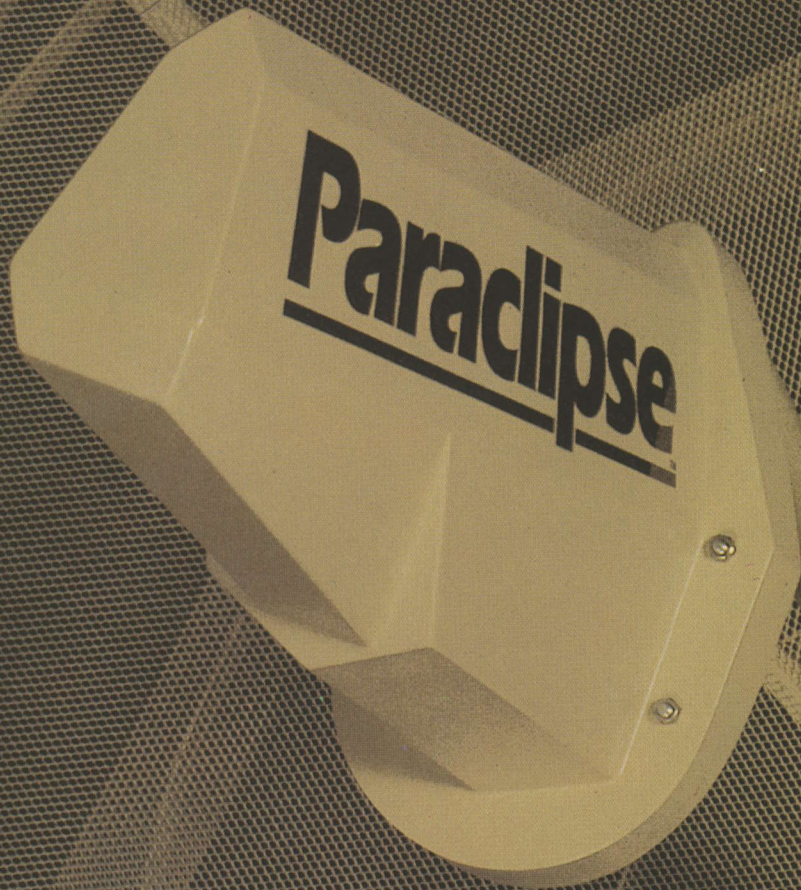
\* Full warranty information available upon request.

Mark Fator photographer

© Copyright 1984 Paraclipse Inc.



# Not Just Another Pretty Face



Paracclipse 3.8 meter (12 ft)

## Paracclipse<sup>™</sup>

HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM

Paracclipse Inc. 3711 Meadowview Drive  
Redding, California 96002 (916) 365-9131 244-9300

PIONEER MEMBER OF  
**SPACE**



The term 'tuned feed' is a familiar, and frequently misused phrase in the satellite antenna industry. The theories behind the tuned feed concept are well tested and are proven to be sound. Its meaning is rather broadly interpreted and the appropriateness of its use is not always apparent. The question as to whether you actually get a tuned feed with a particular antenna is debatable.

We hope you will spend a few minutes reading this ad. Perhaps it will clear up some of the mystery about tuned feeds and allow you to draw your own conclusions.

### A Measure of Performance

An antenna's performance is determined by how cleanly it can amplify the microwave signal (expressed as gain), without amplifying unwanted signal contamination (expressed as noise). Since noise is always present to some degree, it must be considered as part of the performance equation.

Greater gain, lower noise, means better performance. This equation of signal gain over noise temperature:  $G/T$ , is an antenna's measure of performance.

### Feedhorns in General

Each feedhorn configuration is engineered to have an ideal focal length over antenna diameter ratio (F/D), where its optimum performance is achieved. Operation under any conditions other than these 'ideals' will result in a loss of performance.

Antenna manufacturers, with varying degrees of success, design

their equipment to conform to these constants. Each antenna manufacturer must base his choice of feedhorn on how closely its specs match the requirements of his antenna.

The result is that today's market offers literally hundreds of antenna designs that differ in shape, size, surface, parabolic symmetry and focal length over diameter ratios, while there are only a few different feed configurations available to choose between. This inequity creates a situation where some compromise in performance is impossible to avoid unless you have a true tuned feed.

### Illumination, Over, Under and Perfect

If the antenna F/D ratio is flatter than the feedhorns optimum focal length over diameter ratio, or the feedhorn is positioned beyond the perfect focal length, over-illumination occurs. The result is a poor picture due to the excessive noise picked up from the perimeter of the reflector.

If the antenna F/D ratio is deeper than what the feedhorn is designed to accommodate, or the feedhorn is positioned short of its ideal focal length, under-illumination occurs. The result is wasted signal, a weak picture and poor performance from too little gain.

For the feed system to properly illuminate the parabolic reflector, it must be positioned at the exact focal point where the microwave signals reconvene. For maximum efficiency, the feedhorn F/D ratio must be tuned to match the antenna F/D ratio exactly.

In the recent past, all you needed was a pretty good antenna and enough savvy to choose the right feedhorn. If you could demonstrate a picture, you sold equipment. If you sold equipment, you were in business.

At Paraclipse we think higher performance is everything, and we build our antennas accordingly. We've incorporated some subtle but important changes in the specifications of our feedhorns and have realized a significant reduction in antenna noise temperature.

After extensive research and development, range tests prove a 33% reduction in antenna noise temperature for the 2.8 meter Paraclipse and a 32% reduction for the 3.8 meter Paraclipse with the new tuned feed systems. Our focal length/diameter ratios are mathematically perfect and each feedhorn is truly tuned to properly illuminate the antenna reflector it comes with.

The new optimized feed system derives maximum signal strength with a minimum of noise. The result is a stronger, cleaner picture from even the weakest transponder, with greater gain and less noise. The only thing that has stayed the same is the price.

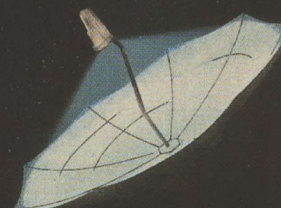
And to top it all off, we have a handsome new weather shroud that is molded in special Paraclipse colors. The new hood is made of tough, ultraviolet stabilized ABS plastic. It will protect the sensitive electronics from the long term effects of sun and weather, and it will identify your equipment as genuine Paraclipse.



**Over-Illumination:** Excessive noise enters the feed system from the perimeter of the antenna and shows up as sparklies.



**Under-Illumination:** A poor picture and an inability to monitor a weak transponder. The signal is attenuated and there is too little gain for good performance.



**Perfect Illumination:** The feedhorn F/D is tuned to exactly match the F/D ratio of the antenna. Full and clean illumination of the entire reflector. A strong, bright picture.



# Nobody Does It Better



Paraclipse 2.8 meter

There are a lot of different ideas about the best way to build a home satellite system. You owe it to yourself to shop around and see what is available. Examine the equipment closely and ask questions about anything that you don't understand.

Keep in mind that the soonest you'll know the true cost of any system is after

you've seen the end of its service life. Try to separate the facts from the promises and buy from a reputable manufacturer.

Study the choices, because only after you know something about the various solutions will you be able to make an intelligent choice between them.

## Paraclipse

HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM

Paradigm Manufacturing, Inc.  
3711 Meadowview Drive  
Redding, California 96003  
(916) 244-9300 (916) 365-9131

©1984 Paradigm Manufacturing, Inc.  
Redding, California



## BEFORE TVRO/

## THE STORY OF HOW IT ALL BEGAN

### NO Dishes

Believe it or not, there WAS television before there were dishes! Yes, it was 'pale' by comparison to our present **114 channel** (latest official FCC count) channels of satellite television. But it **was television**, nonetheless.

The history of television, per se, is of little real interest to us here. Many authoritative books have been written on the subject and many more will be in the future. Our focus here is on the 'impetus' or reason why satellite TV 'took off' as rapidly as it did.

As we entered the TVRO era (ie. the 1980's), consumer television was vastly better than it had been two or even one decade(s) prior. Through the early 1970's, television for the majority of America meant ABC, CBS, NBC and perhaps a PBS station. Those millions fortunate enough to reside close to major population centers (such as New York) were also treated to a handful of 'Indie' or independent stations; stations that specialized in old movies, some live sports, and off-network re-runs of previously popular network fare.

Cable television was changing all of that in the 70's; cable prospered because it offered viewers new choices in programs; choices not available with rabbit ear or rooftop antennas. Cable, in the mid-70's, was



CABLE had to wire individually to each home, then as now. Cable was a fine answer in metropolitan and suburban areas but it was not economic for rural dwellers.

running out of steam however. New federal regulations, new legislation in Congress, and new court decisions were cutting back on cable's 'freedom of choice'. Cable entrepreneurs very much wished to 'move into' the big city markets. After losing crucial court, legislation and regulatory battles, they knew they could not do so, profitably, if they were limited to the programming choices those rulings allowed.

**HBO** or Home Box Office offered the first new programming choice. It began as a service in northeastern Pennsylvania, tied by terrestrial microwave to a small tape deck studio in New York City. Each evening a couple of motion pictures were sent out, on microwave, to the affiliated cable systems. The cable systems offered these 'extra' or 'optional' movies to their subscribers for an add-on fee. Cable operators quickly found that they could collect as much 'new money' for the HBO evening (only) service as they were collecting for the full dial full of multiple channels. It seemed very promising (and it is worth noting that the first movie HBO ever transmitted, in this fashion, was titled '**Sometimes A Great Notion**').

In short order, HBO found they had the **potential** of a winner, but there were 'numbers' problems; they could not reach sufficient cable systems using terrestrial microwave to make it pay. Each new cable system required a brand new microwave link system and costs into the hundreds of thousands of dollars per cable system were the norm. 'Somehow' they needed to get free of the expensive terrestrial microwave.

### You already know the answer to that one!

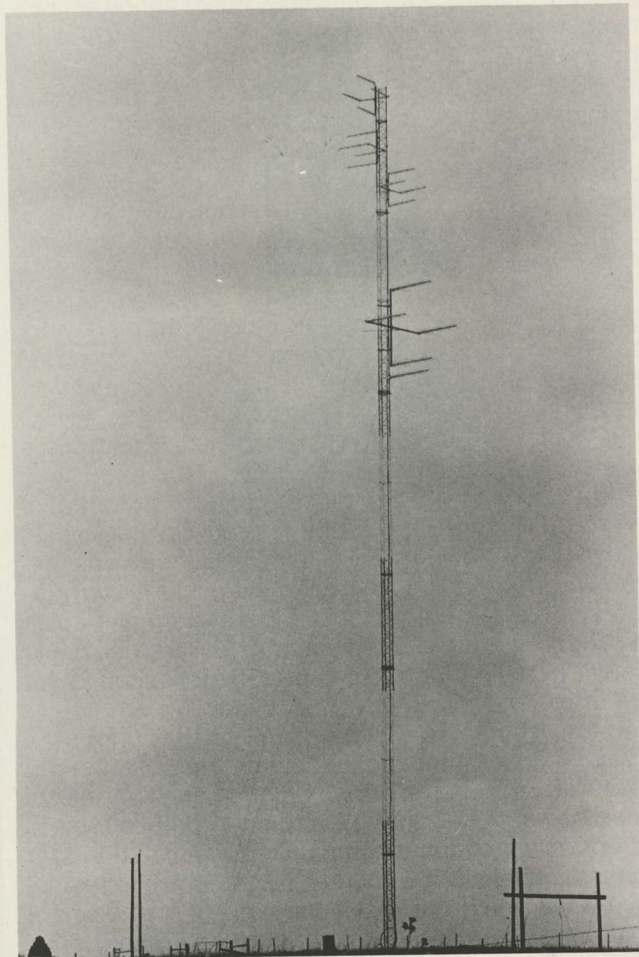
Canadian (domestic) satellites were first. First ahead of RCA and Western Union. Canadian use of satellites was quite narrow; their primary purpose was to provide telephone and communication links to the far northern regions of the country, places which terrestrial microwave could not reach because of the expense (traveling 1,000 miles on terrestrial microwave, 30 miles in a 'hop', to reach 500 people at the end of the circuit was certainly not cost effective!). Western Union was the first US service and RCA followed. By 1975, there were three North American domestic birds. Western



Union had 12 channels of capacity, and they quickly filled most of those 12 with PBS and special events and leased circuit users. RCA had a 24 channel capacity and they were not filling up as fast as Western Union. That's when HBO's **Gerald Levin** made RCA a brash offer; he wanted his firm to lease a transponder so that movies could be transmitted to cable systems nationwide. RCA was intrigued but had it been anyone other than Time, Inc. division HBO, they probably would have quickly lost interest. If HBO was not impressive in 1975, TIME, Inc. was, as always, impressive.

**The cable industry 'saw'** a demonstration of satellite TV in 1974. An 11 meter transportable (well, it did move!) trailer mounted antenna system was hauled to Southern California and cable operators attending a national meeting there were able to witness an address, to their industry, by an influential U.S. Congressman originating in Washington. It was an interesting, if not infectious display. Nobody really thought it would change their business lives, at the time.

Barely months later, in April of 1975, HBO made their big announcement. 'HBO was going on-the-bird'.



**CABLE TV** was 'it' for consumers who wanted greater TV program diversity in the 70's and before. Only federal regulations, laws and court decisions had changed cable's ability to 'compete'; something 'new' was needed.

The response, again, was less than over-whelming. Cable operators liked the **concept** of HBO programming; they loved the thought of doubling their income levels. They did not like the much bantered about costs involved; upwards of \$125,000 for a 9/10/11 meter dish and electronics. Within three years some of the larger HBO affiliates would be 'netting' enough in a single month from HBO service to totally pay for a \$125,000 dish system. But in 1975, it all seemed like a very risky gamble.

HBO formally inaugurated their service (using a vertically polarized transponder -17- on RCA's original F2 bird) at **9PM** eastern on the **30th of September, 1975**. They really pulled out the stops on this one; offering 'exclusive cable view' of the Mohammed Ali 'Thriller From Manila' world championship bout 'live via satellite'. Two cable systems were 'on stream' at the other end; one in Mississippi and one in Florida.

**HOME BOX OFFICE, INC.**  
and  
**SCIENTIFIC-ATLANTA, INC.**

Cordially Invites You to Visit  
Scientific-Atlanta, Inc.

To  
Witness the Inauguration  
of

**HOME BOX OFFICE'S  
SATELLITE SERVICE**

On  
Tuesday, September 30, 1975  
9:00 P.M.

Admission Will Be By Presentation of This Invitation Only.

HBO/Scientific-Atlanta invitation to attend the opening night's telecast on September 30, 1975. Security was 'tight' because S/A worried about 'unauthorized disclosure' (FCC 605 regulations). Invitation keepsake courtesy of Richard L. Brown, present SPACE Counsel who attended event.

The first in-depth look at satellite television for cable appeared in the October 1975 issue of **CATJ** magazine; a 17 page article that centered around early pioneering work (and products) at Scientific-Atlanta. Reading this early 'treatise' is a lesson in nostalgia; photos of huge ten meter dish hubs being spun on giant 'milling machines', swarms of workers assembling huge metal antenna petals, receivers that cost upwards of \$12,000 and LNAs that 'boasted' noise temperatures in the 300-400 degree range and which cost upwards of \$5,000 each!

The same editorial treatment was also a lesson in 'modern' microwave theory, and it plainly tells us that the early practitioners of our 'art' came into the field straight out of Bell telephone sweat shops. For example,





this paragraph on 'circuit reliability':

**"By theory, 99.99% reliability is almost impossible** with a downlink if you consider and include the five annual solar-noise pass days. If the solar noise eruptions last 10 minutes each and there are five of them, we have 50 minutes of lost time per year. Since the solar noise is a daytime phenomenon and it is roughly centered on the middle of the day (ie. when the sun is south of you, in line with the bird), the lost time will not be in prime time and will therefore possibly not be an important factor.

**"If all other factors,** including any down time due to equipment malfunction or any lost time due to rain loss or excessive rain-created polarization twist, are ignored, the solar noise loss time amounts to nearly the total permissible lost time per year, for 99.99% reliability. At some point between 99.9% and 99.99%, the system should prove more than satisfactory to the CATV user."

It was, as you can tell, a very theory-laden business in those days. Pages and pages were consumed discussing all of the things that **could** go wrong; and the

general tone, even of the optimistic texts, was that you had better plan your system very carefully, check it over several times to be sure you had not forgotten anything, and then spend more money than you really needed to, **just to be safe!**

A lot of people had their jobs on the line in this era; engineers charged with the responsibility of specifying equipment for cable firms (ie. the buyers) didn't fully understand the technology, and they were being asked to select equipment which would do the job. Cable management was not technical and it was totally unconvinced that 'satellite microwave' was even sane, much less safe! So the cable people did the 'safe thing'; they specified huge antennas (to 11 meters in diameter) and redundant LNAs and back-up receivers 'just in case'. Nobody, well hardly anybody, dared think about 'reducing the margins' and lowering their 'reliability levels' below than 99.99% goal.

**One man did;** it ultimately would come close to costing him his job at Scientific-Atlanta. His name was **Harry Marron** and he had 'a vision'. We'll tell you about it, shortly.



Marron, in **CATJ**, explained how the S/A ten meter antenna was designed. Some of his better quotes, in terms of 'then' and 'now', follow:

"**There are 24 parabolic panels** in our ten meter dish; each antenna is assembled twice. The first time it is assembled is here, at the factory; we want to make sure everything fits. The next time it is assembled is at the final installation site . . ."

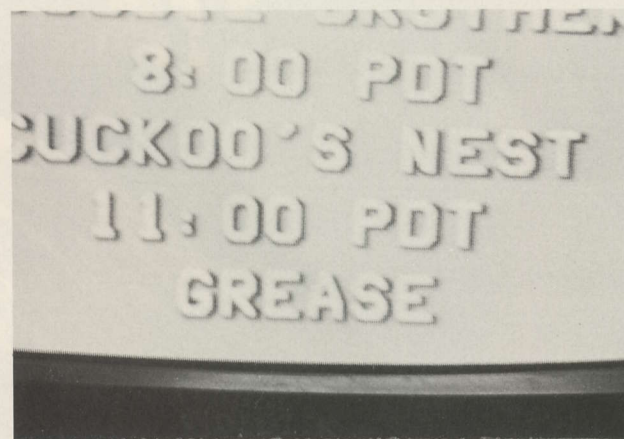
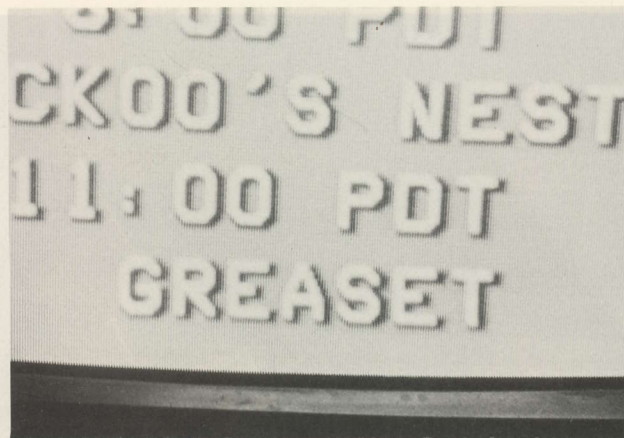
"**Each panel** (remember there are 24 of them!) **weighs around 200 pounds**. Four men could carry it a hefty distance if they had to . . ."

"**I envision the day** when we will be backpacking the whole rig onto a mountain top someplace . . ."

"**The hub assembly weighs 800 pounds** and a 'small' two man helicopter or a crane can lift it onto its mount . . ."

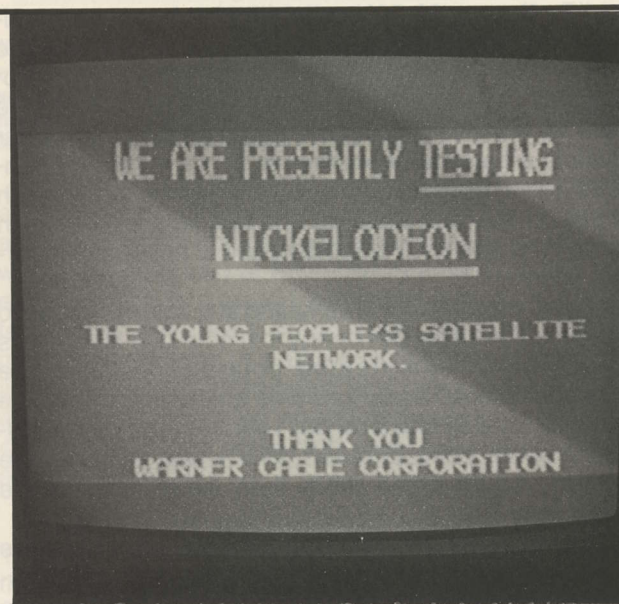
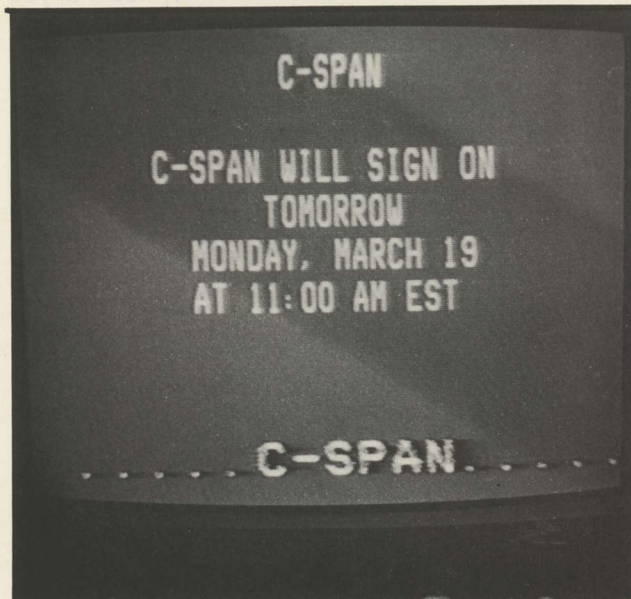
None of this sounds, today, like something that had even a glimmer of hope to become a consumer product'. But Marron was far sighted. He ended his **CATJ** interview with a quotation that got him into plenty of hot water with S/A management. It went like this:

"**There are several 12 foot dishes around here which failed to pass inspection; they have minor flaws, or blemishes in their surfaces. These are dishes S/A cannot sell to a (commercial) customer. However, with \$50 in materials and some of my own time, I could whip one into shape for installation in my own backyard. I would still have the preamplifier (we call them LNAs today!) problem and my pictures would not be nearly as good as with the commercial ten meter dish. But think of watching movies in your own living room for just \$8 to \$10 per month! Oh, I'd pay HBO of course.**"



HBO was not nearly as professional 'then' as now; for example, sometimes they mis-spelled feature film names in their before-sign-on 'roll display' that served as an in-home program guide for viewers.

## TVRO & CSD/ OUR SIXTH YEAR!





Introducing the DSB-600:

# EVERYTHING YOU'LL EVER WANT IN A HOME RECEIVER.

- Block downconversion • Capable of multiple-receiver hook-up
  - Picture quality comparable to commercial receivers
  - Both 4 GHz and 12 GHz compatible
- Video clamp/unclamp switch and composite baseband output
  - Frequency stability unmatched by other home receivers
- Compatible with mechanical and electronic polarizers as well as DX's dual-polarity system • Affordable price

The moment you see the picture you'll see the difference. In fact, from every standpoint—quality, performance, technology, price—the new DSB-600 from DX is a step ahead of other home receivers.

It has the DX quality features you've looked for, but for much less than you'd expect to pay. Developed and engineered by DX Antenna, an international leader in satellite reception systems.



**DX COMMUNICATIONS, INC.**

A Subsidiary of C. Itoh & Co. (America) Inc.  
116 Midland Ave., Port Chester, NY 10573 • (914) 939-8880  
Manufactured by DX Antenna Co., Kobe, Japan





# PERFORATED PERFECTION

Make the break from mesh to a higher quality see-through dish. Take a look at Winegard's perforated aluminum 10-footer. There's nothing else like it on the market.

Winegard's new dish has a sharp, clean look of quality. It's a new level of dish technology offering advantages other see-through dishes can't deliver. Like 39.5db gain, F/D "Deep Dish" ratio of 0.283, lightweight yet rugged construction, super-simple assembly, weather protection, high performance and a look of class that your customers will appreciate. What more could you ask for?

## A TRUE PARABOLA

The ultimate goal in designing a satellite dish is to create a reflector that is a "true parabola" - providing "near-perfect" efficiency.

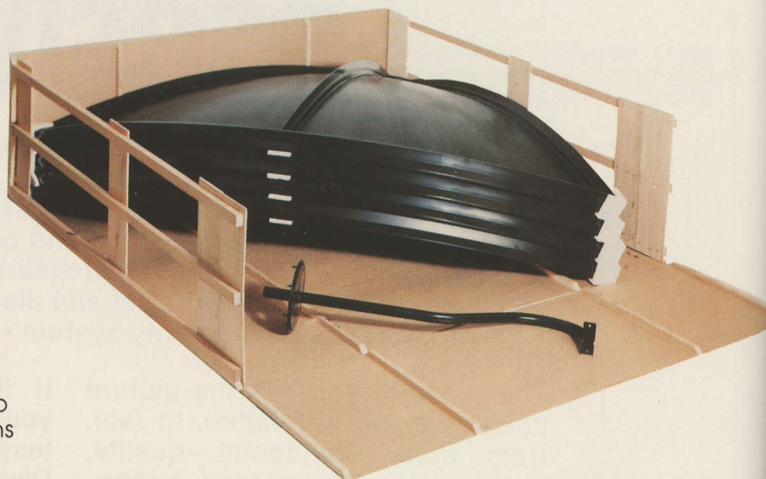
Winegard engineers have developed the truest parabolic dish of any of the see-through category. Each petal, rib and outer ring is stretched-formed to a parabolic shape with specs so tight it took months to perfect the process.

Our exclusive extruded rib and locking system has simplified assembly, eliminating the need for hundreds of bolts, nuts, washers and fasteners. Every time you attach a bolt, screw or fastener to a dish you add another stress point, distorting the shape. With Winegard's extruded rib and locking system, the stress is uniform across the dish, maintaining its true parabolic shape and integrity.

## LIGHTWEIGHT BUT RIGID PERFORATED ALUMINUM

Not only is the Winegard perforated aluminum dish lightweight and easy to handle, but it is extremely rugged, durable and well constructed. You can actually see through the perforated petals which are constructed of .040-gauge anodized aluminum. The extruded aluminum main ribs, which provide the basic structural support, are 1/8" thick. The locking ribs are .070" thick and lock the perforated aluminum petals tightly in place. A double-walled outer rim provides an area to insert rim splices at all joints for perfect alignment and additional strength.

Wind-loading capabilities are outstanding with a wind survival rate of 125 mph. And, because the perforation eliminates 36% of the surface area, the dish diffuses solar heat, decreasing amplifier noise.



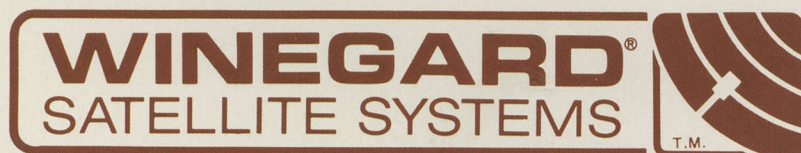
## SHIPPED IN FOUR SEGMENTS FOR QUICK AND EASY ASSEMBLY

Winegard's 10-foot perforated dish is shipped in four quarters. Total weight is only 92 pounds. It's easy to handle and transport. All that's required for finished assembly is fastening the main ribs together with 16 stainless steel nuts & bolts; placing four rim splices into the outer rim; and securing with 8 screws. Just a 20 to 30 minute job for two people.

## EIGHT COMPLETE 10-FOOT SATELLITE TV PACKAGES

Winegard offers eight complete 10-foot perforated satellite systems that include antenna, pedestal or post mount, back-up structure, Polarotor I, 24-channel receiver, LNA, wire and a choice of motorized or non-motorized. Available in satin black baked enamel or smoked chrome anodized finish.

Winegard perforated . . . a new standard of excellence.



U.S. Patent Pending



© 1984



# WINEGARD'S CLEARLY SUPERIOR SEE-THRU DISH





## EARLY TVRO/

## THE FIRST HOME EQUIPMENT EFFORTS

### ALMOST Before . . .

Those \$125,000 9 or 10 meter terminals from S/A caught on surprisingly well and there was only token 'competition' from Andrew and a handful of other would-be suppliers. But it was already plain that the 'market size' for \$125,000 priced terminals was quite limited. Some background is in order.

The U.S., back in the 60's, had become a part of the Intelsat consortium. The U.S. corporation, COMSAT, was traded on the major exchanges and it controlled approximately 28% of the worldwide Intelsat investment. Intelsat was more than an 'unusual international corporation'; it was a hybrid mixture of private enterprise (i.e. Comsat stock ownership) and government agencies (i.e. foreign nations which 'owned' their respective 'shares' in Intelsat through their respective nationalized telephone and communication firms).

The U.S. position was molded after the free enterprise system; 'competition was a healthy environment.' The foreign firms, through their nationalized ('PTT') communication companies, had a different view; **competition, in communications, was unhealthy.**

With the U.S. controlling a minority of Intelsat, the foreign view prevailed. Everything involving Intelsat, ev-

everything Intelsat 'touched,' was built upon the 'monopoly' foundation. And Intelsat had its own bureaucracy. One of these was an engineering bureaucracy which wanted to perpetuate its own control over that segment of Intelsat activity. It was this engineering bureaucracy which was able, in 1969 and again in 1971, to push through the Intelsat Board of Directors new 'standards' for all terminals inter-connected to Intelsat. The American FCC, fumbling to establish their own **U.S. regulations** for domestic earth terminals in the 1974/75 era, leaned on the only regulations 'handy'; those from Intelsat.

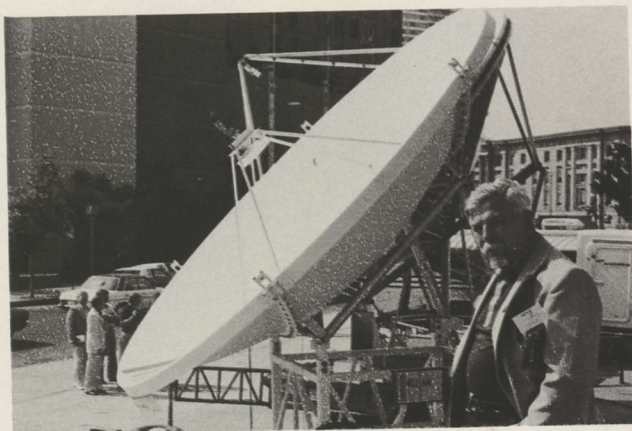
Intelsat had decided that no antennas smaller than 9 meters in diameter would be 'authorized' for their system. Nine meters was just over 29 feet in size; not small. The American FCC adopted the same rule and so, when HBO came along with a string of cable affiliates in 1975, the FCC told them the TVROs they installed would have to be 9 meters in diameter or larger. And that's where the \$125,000 terminals came from; a bureaucratic decision based upon a self-serving engineering bureaucracy at Intelsat.

Engineers who refused to take the FCC 9 meter limitation at face value pondered how smaller dishes might work. The FCC was reluctant to address the issue directly; they had to be forced, it would later turn out.

**A handful of dedicated people** participated in this project. **CATJ Magazine** served as a focal point for their efforts and the battle was on. First, a credible set of data had to be created to convince the FCC that the 9 meter limitation was 'in error.'

There were two key players here; both had self serving but no less noble incentives. **Jerry Pell** was a Sales Manager for Prodelin; back when Prodelin was a family owned affair (M/A Com owns it now). Pell had a 5 meter dish (plus a line of smaller dishes) he could sell; his firm was not interested in building larger dishes. As long as CATV dishes were 9 meters and up, Prodelin could not 'play' in the CATV ballgame. Pell wanted to sell dishes but the regulations had to change first.

**Howard Hubbard** was president of Antennas For Communications (AFC); back when AFC was privately



**HOWARD HUBBARD**, the man behind the AFC portion of today's Microdyne, was instrumental in the battle to get the FCC to drop their 9 meter antenna ruling. That's one of his 5 meter dishes in the background.



owned (it is today a part of Microdyne). Hubbard had **two problems** with the '9 meter rule'; first of all, he, like Prodelin, was not into building 9 meter size dishes. That kept him out of the CATV ballgame too. But more important than that, Hubbard was the near-perfect antenna design engineer who knew, instinctively and by careful measurement, that a smaller antenna (say a 5 meter) **would provide** a perfectly acceptable picture for CATV use.

Pell rounded up some other suppliers in the 4-5 meter antenna class range and they set out to make as many **'public tests'** of 'small antennas' as possible. This was done late in 1975 and through mid-1976 at various cable TV trade shows. The 4.5 and 5 meter antennas were installed as 'active exhibits' and people (cable operators) were invited to **compare** the pictures on these systems with the (always present) pictures on the big 10 meter jobs. The usual decision was **"You cannot tell them apart . . ."**. The FCC watched all of this, nervously, not quite sure how to react. None of those firms putting on these demonstrations had an FCC license to do so (the FCC insisted that EVERYone have a receiving license in those days) and eventually they would enforce that rule. But not before hundreds, perhaps thousands of cable people had seen high quality TV on 'small' dishes.

Hubbard, meanwhile, went to work making tedious measurements with his 5 meter size antennas. He compiled ream after ream of data which he insisted 'proved' that small antennas (4.5 to 5 meters in diameter) would meet EVERY FCC technical requirement EXCEPT what he termed their 'arbitrary nine meter size requirement.'

**CATJ Magazine**, meanwhile, found itself in the position of being able to reach Congress and editor Cooper had the opportunity to testify before a Congressional Sub-Committee (on Telecommunications). He used that opportunity to lay into the FCC's rule. Startled Congressmen and their aides first heard how satellite communications was changing the face of American cable television, and then were incensed to learn that because of an FCC rule, only the **larger cable firms** could afford that technology. Just to be safe, **CATJ** had created (with the assistance of then legal counsel **Richard L. Brown**) a formal 'Petition' to the FCC requesting that the 9 meter 'rule' be changed.

It all came to a head in the fall of 1976; a Congressional Sub-Committee placed considerable pressure on the FCC, Hubbard's measurements piled up and Pell's public demonstrations riled up sufficient cable operators that they, in turn, got their own Congressmen and Senators into the act. The FCC finally gave in and decided the **CATJ** petition for Rule Change, and others subsequently submitted, should be accepted. Between December 7th and December 15th (1976), the FCC finally addressed the issue before them and because of the work of people like Jerry Pell, Howard Hubbard, a chap named **Don Buscher** of ITT, CATA's co-counsels **Steve Effros** and Rick Brown, we put it all together. The



**THIS WAS A FEED/** a Prodelin 10 foot 'button hook' type feed circa 1978 used rigid waveguide to couple the front-of-dish feed to the LNA that mounted behind the dish. Danny Weathers prepares the installation.

final vote was 7-0 and cable's entry into small terminals was off and running!

**Well, almost.** While the FCC had done away with the '9 meter rule,' they still required full 'licensing' for all TVRO terminals; an issue that would dog us until the fall of 1979. Nonetheless, on April 1, 1977 the first 'legal' (as in FCC licensed) 'small TVRO terminal' was installed and turned on in **Kalispell, Montana**; fittingly, a 4.5 meter Prodelin dish system.

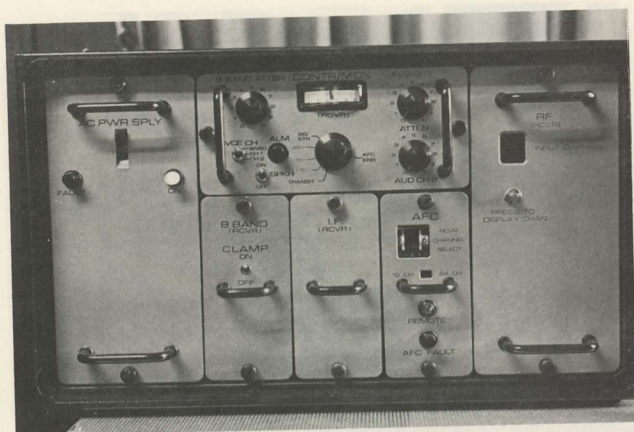
Costs, of course, dropped rapidly. The former \$125,000 'entry fee' to satellites 'plummeted' down to the \$35,000 region in one big jump. That immediately caused some cable operators to wonder how long it might be before **that** 'cost plateau' would drop as well. They would not have long to wait; by mid-1977 the prices would be in the \$15,000 region (for a fully installed 4.5 meter system).

With a temporary 'breathing spell' in the legal arena, the concentration shifted to getting 'smart' with the new technology. Magazines, in CATV, concentrated on understanding the new equipment and systems. Two factors that would ultimately play upon the development of (truly low cost) 'home TVRO' quickly became apparent; LNA cost versus performance, and, receiver cost versus performance.

**LNAs first.** By mid '77, 120 degree LNAs were 'state of the art' and priced accordingly; with perhaps 250 total LNAs (120s and up) available per month, **worldwide(!)**, no more than 50 appeared to be 'as good as 120.' Price? Around \$3,000 each if you could find one! As we shall see, separately, the bottleneck was with the GaAs-FET devices; still new in 1977 and only available in small quantities from a handful of sources. One of the most 'arousing' stories around in 1977 was that RCA had ordered two (2!) **75 degree** LNAs from a major supplier at **\$7,500 each**. The supplier had been able to produce **one** but in six months of trying, they couldn't get a second one in that (low) noise figure region.

**Receivers next.** Scientific-Atlanta was first but they





TERRACOM 1977 era TVRO receiver was slightly modified 4 GHz terrestrial video microwave receiver. It was **NOT** user friendly, but then the user only had to adjust it once (when it was installed); after that, the receiver would (in theory) be left on a single transponder (to feed a cable system) for the rest of time.

were followed by Microdyne and Terracom. All receivers had a single audio sub-carrier demodulator board; typically on 6.8 MHz (that matched the cable or HBO selected sub-carrier frequency). All receivers were designed for rack mounting and the parts count would be 400-600% of a modern day AVCOM or Earth Terminals unit. Yes, they were expensive (\$7,500 up and a long long line waiting ahead of you for delivery).

Microdyne and Scientific-Atlanta were in a 'spec-man-ship' war in 1977; each claimed their receiver had a 'lower threshold' than the other. S/A offered something called 'threshold extension,' a circuit they claimed lowered the noise level of receivers making improved weak signal reception possible. Microdyne countered with their own numbers and the 'war' was on. Both firms produced satellite video receivers which delivered superb (high quality, high resolution) television pictures and stable, high quality sound. That either produced a receiver with superior weak-signal reception abilities is questionable (\*).

S/A was certainly the 'firm to beat' in 1977 and 1978; they had one considerable advantage and that was that they sold **their antenna with their receiver(s)** and **they installed** the systems with **their own crews**. S/A could bid a 'turnkey system' and that is what the fearful cable

**\*/ A Microdyne receiver (Model 1100-TV (VT)) acquired in 1977 and factory updated and aligned in 1981 and stored since that date was recently unpacked at the CSD Lab for an 'A'/'B' comparison with modern day receivers. Even low-cost BDC units (such as Anderson units) 'walked all over' the \$7,500 Microdyne 'vintage unit' in sensitivity, although if the Microdyne was fed a strong transponder signal, the difference in video picture quality was amazing; Microdyne's older unit had superb quality video and was dramatically better than the newer generation low cost units.**

operators desired; a completely installed and operating dish system. Microdyne and Terracom made fine receivers (comparable to S/A) but they were at a marketing disadvantage; **they didn't sell antennas**. A cable operator could buy a complete system from S/A, or deal with Terracom for receivers and SCI for LNAs and Andrew for antennas; and then somehow try to sort out how the whole system would be installed.

**The obvious happened;** Microdyne teamed up with AFC for antennas (and would later acquire AFC) and Terracom teamed up with Andrew. That made the antenna suppliers the 'turnkey installers' (since all of the real work was related to the antennas) and the receiver people would send a receiver field engineer along on each installation to make sure the receivers performed properly. All of this continued to cost big bucks, of course, and the sharper cable operators figured out that if they did the installations on their own, they could save a few thousand.

As prices slowly drifted down, and LNAs became more plentiful (and, in time, lower in price), there started to be a very modest 'surplus' of second-rate TVRO hardware around. Every now and again a receiver



SHOWING off satellite TV was big time stuff at cable shows in this era; here, Microdyne, teamed with antenna supplier RF Systems, attracts a crowd with a promise of Ted Turner video.





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would end up on a shelf or an LNA would be 'in stock.' The first 'private terminal enthusiasts' were starting to get interested.

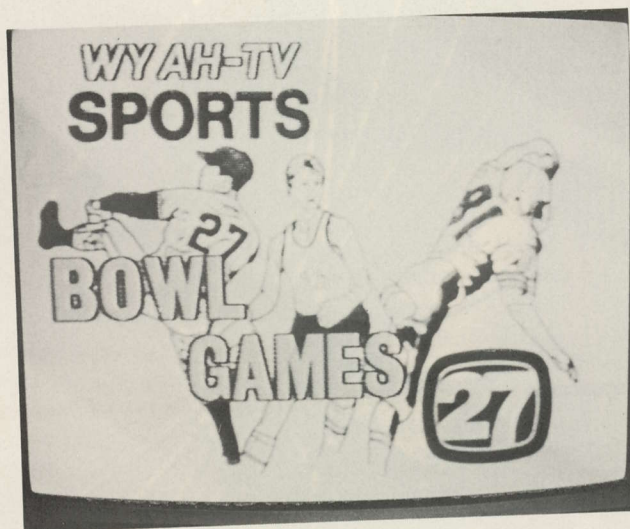
There were undoubtedly SOME private terminals installed for private homes in the 1978 era. They were clearly 'illegal' (i.e. they did not qualify as cable system dishes and only cable firms were **able** to get licenses) and suppliers who agreed to install (remember, you didn't DARE do it yourself!) such 'clandestine terminals' seldom talked openly about them.

At least two of the then current industry installing engineers with special expertise in satellite systems were close to this aspect of the industry in 1977/78. **Tom Humphries**, then in charge of LNA sales for Texas LNA manufacturer Scientific Communications, Inc. (SCI) and **David Alvarez**, then in charge of field installations for Microdyne (and AFC antennas as the two became one) openly discussed private terminal systems they were familiar with before live television cameras at an industry meeting (CCOS '78) in mid-1978. Alvarez and Humphries agreed, at the time, that 'no more than 15' such installations existed and one of those was the property of the Chairman of the Board of Holiday Inns, outside of Memphis. Alvarez recalled:

**"It was raining and it was bitter cold. Because Holiday Inns had agreed to be a part of the Ed Taylor operation that brought independent station KTVU in San Francisco up on F1 (KTVU was originally on TR1 on F1) and because Holiday was installing terminals at a few hundred Inns all across North America, he wanted a terminal at his home. Microdyne got the contract and we were just finishing it up when I first met the man. Dressed in a bathrobe, he had risen out of a sick-bed to come out to inspect our work. His wife was frantic, certain he was going to catch pneumonia and die. Frankly, I shared her fears. He was absolutely driven by the idea that in HIS home he would have HBO and WTCG and an entire menu of satellite signals."**



**DAVID ALVAREZ** (left) of Microdyne and **Tom Humphries** (then of SCI) before the color cameras at CCOS '78 in Oklahoma; they were discussing TVRO field installation problems and they had much to cite from!



**CBN WAS NOT** always CBN; they 'started satellite life' as WYAH, a channel 27 UHF indie that was owned and operated by CBN.

That scene would repeat itself hundreds of thousands of times in the first few years of the 80's; but in 1978 it was certainly unusual. To acquire a home terminal, **first** you had to have a considerable chunk of excess cash. **Then** you needed some friends 'inside' of the cable/TVRO business since money alone would not buy equipment which was in frightfully short supply.

The cable industry had settled into a \$15,000 per terminal bottom end pricing structure by the summer of 1977. That's when Peter Warren appeared. Warren was associated with an El Paso, Texas group that operated a UHF religious broadcast station. Warren wanted to package TVRO systems to cable companies and he had a 'plan.'

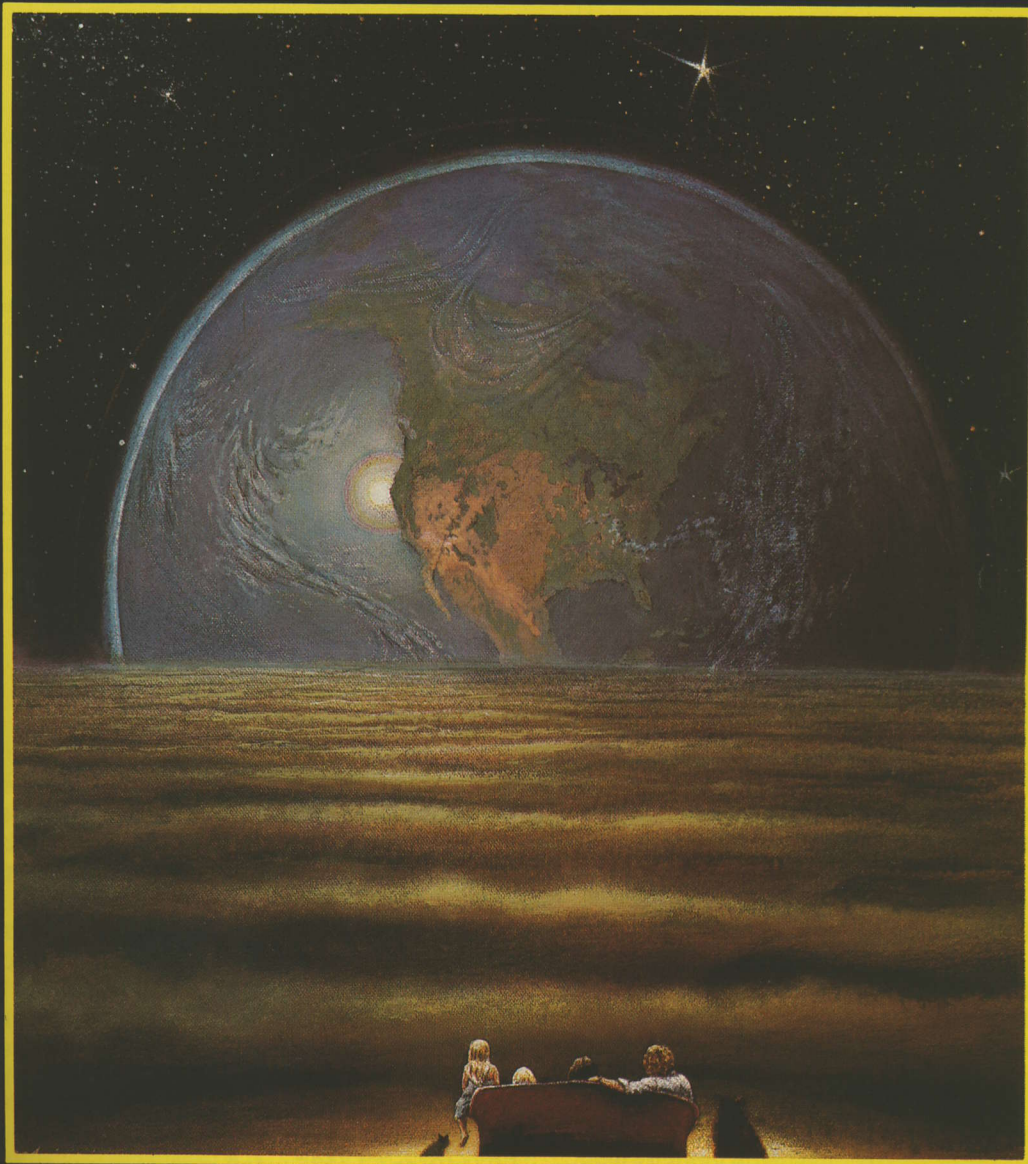
First he would go around and locate a substantial group of cable firms that still needed a TVRO; he wanted 25 as a minimum and hoped for 100. He had figured out that if they could, as a group, order 25 to 100 antennas, LNAs and receivers . . . **all at one time**, they would get a better price. He also was working his own side of the street; to 'belong' to the group, the cable operator had to agree to carry CBN (or PTL) 'fulltime' on his cable system. Warren wanted to expand the viewing base for the religious telecasters on satellite.

The 'promise' to carry CBN or PTL was Warren's profit. By placing orders for 25 to 100 of each part at a time, he commanded excellent prices (i.e. maximum quantity discounts) from the suppliers. He elected NOT to mark the equipment up; the price reductions he won from the suppliers he passed on directly to the cable firms. Those savings were not inconsequential; the \$15,000 'floor' for TVRO systems, installed, **dropped to \$12,000** in one step. Established suppliers were caught in the middle; they WANTED the big order, but they also wanted to be able to continue to sell installed terminals for \$15,000 (again) AFTER the 'special deal' was over.

Only it didn't work that way. Word of the '\$12,000 package price' spread rapidly in the CATV world and



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cable operators were suddenly resistant to ANY 4.5 meter terminals that cost more than that.

CATJ reported "**The market is ruined . . . it may never recover**" and one receiver supplier was quoted as saying, "**Boy, is this a buyer-beware situation.**"

Warren's program shook up the cable world and from that point onward, prices dropped a little at a time. But Warren was not done; he had some additional plans; a low-cost receiver. The religious people by early in 1978 were VERY MUCH involved in the future of TVRO.

**CBN was the first** religious broadcaster on satellite; they began in late summer of 1977 after a few false starts. CBN had a 'special' situation; first they wanted to uplink a television **station** they owned in the Norfolk (Virginia) area; **WYAH**. The station programmed some religion and some typical 'indie' fare. The FCC said 'no,' they could not do that. But CBN had already announced their intentions. It took them a couple of months to create a 'special CBN feed' which did not duplicate WYAH, just for satellite.

**PTL was next.** They began uplinking in the spring of 1978. PTL made no pretense of being anything but religion. Warren saw individual churches, UHF religious TV stations such as his own in El Paso, and hundreds of cable systems as potential users of these transmissions. He knew that receivers would be in demand so he set out to 'design' one. Along about this point he worked out an arrangement with USTC, the six meter antenna people and ultimately the little receiver would be called '**The Fellowship Christian Satellite Receiver.**' The receivers were to be built in El Paso and after perhaps 25 were built, the project ground to a halt. Warren eventually decided **he** was not going to make a success of satellite receivers; but once again he left his mark. He had proven that a TVRO receiver could be built for well under the \$4,000 bottom price of other receivers then offered for sale.

The programming 'line-up' in mid-1977 is of interest. Remember that HBO began it all in September of 1975 by coming up with ONLY an eastern time zone feed on TR17 of F2. They didn't stay there long; opting to move to TR24 during 1976. Next to join was HBO for the west coast (TR20) and WTCG in December of 1976. Let's jump now to **September of 1977** while the industry was still very young:

1) **RCA SATCOM F2/ 119° west.**

TR6 / **WTCG** Atlanta (later to become WTBS)

TR8 / **WYAH** (later to become CBN)

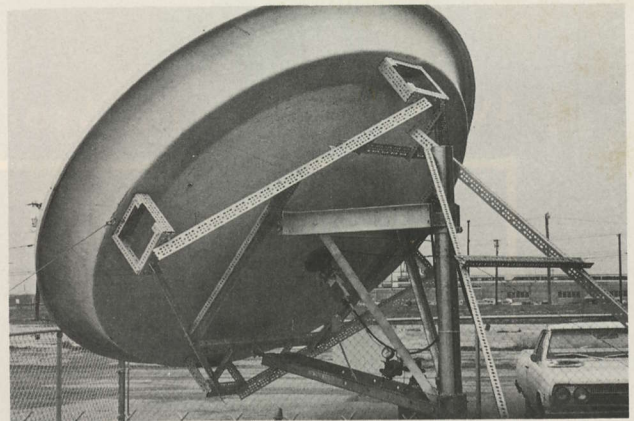
TR20/ **HBO** (west coast)

TR24/ **HBO** (east coast)

That was it! Yes, you could find two channels on ANIK and two to four on Westar but no other regular channels, at all! We'll re-look at how the transponders filled up as the pre-TVRO era matures.

RCA, in spite of the 'slim pickins' on F2 in those days, was getting concerned about their own 'capacity.' It went like this.

F2, at 119 west, seemed an ideal bird for cable.



**TEN FOOT DISH** mounted outside the Garland, Texas headquarters of SCI was used to final-check LNAs built by the firm in the 1977/78 era. Yes, they built their own mount and the dish was indeed 'surplus'!

There were good, high look angles to all of the USA and as its dying days would later show (1980-81), F2 also placed a good signal into such far away spots as the Caribbean. Unfortunately, F2 as a 'custom bird' designed originally for a specialized service to Alaska.

By the end of 1977, RCA said F2 was 'full' or about to 'overflow.' On the surface that didn't make much sense since only one side (the even numbered, horizontal transponders) was actually in use and there was an entire additional side (the verticals) to start using. Like we noted, F2 was 'special.'

RCA had a commitment in their pocket to supply six transponders for specialized Alaska service when F2 was designed. They had designed a special transmit antenna on F2 so that one 'bank' of channels (3, 7, 11, 15, 19 and 23) would be especially 'hot' into Alaska. That was to allow small antennas (down to 4 meters) to be used in Alaska. RCA knew, if it had escaped others, that they really only had six vertical transponders to lease on F2 since **those six** Alaskan were 'gone.'

RCA projected a need for at least **24 CATV** video transponders by late in 1979. To satisfy this demand, **on one bird**, they had to find a bird that could accommodate that many. Their plan was to launch a new bird (F3) by December (1979) but to move CATV services from F2 (119) to F1 (135 west) in mid-year of 1978. After the move (to F1), they would open up the vertical transponders. Until that time, the growth of CATV services would be channel limited. Cable didn't like the sound of that since there was a 'heady' attitude that cable could support an almost unlimited number of specialized (satellite delivered) program channels.

While THIS argument was boiling, another one was starting. Mutual (Radio) Network began it.

Late in November (1977) Mutual signed a contract with Western Union to transmit the Mutual radio network audio feeds via satellite. That was the good news. The bad news was that Mutual wanted to use small dish antennas no bigger than ten feet at their 'hundreds' of radio station affiliates.

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The FCC was not happy with this direction; they had just gone through the 9 meter routine and did not relish a new round of 'smaller and smaller' dishes. Mutual stuck to its guns and pretty soon ABC (radio) joined the chorus. NOW the FCC **knew** it had a problem.

As the pressures to get the FCC to 'lower' the minimum size for a licensed terminal mounted, a Mutual spokesman was quoted in **CATJ** with the **real bottom line** that we had all been waiting for. He said:

**"We admit that we may be hoping the FCC will look at this mushrooming use of receive terminals and simply agree that the best approach to this problem is to do away with mandatory licensing of receive terminals . . ."**

And that was in December of 1977; barely one year after the FCC allowed themselves to lower antenna size restrictions from 9 meters to approximately 4.5 meters. The ballgame was not over yet.

Those who were beginning to mutter, out loud, about the lunacy of requiring FCC licensing of every TVRO (or the anticipated ARO/ Audio Receive Only) terminal(s) were 'encouraged' by the FCC's own figures:

- 1) The 'typical' TVRO (cable) system application cost the cable operator \$2,240 to 'prepare' (just the paperwork) late in 1977;
- 2) In the last four months of 1977, the FCC received 103 TVRO license applications; of which 69 were for 4.5 or 5 meter antennas;
- 3) The 'typical' license application specified an installed cost of \$36,843 in December of 1977;
- 4) And, the 'typical' application took 75 days for the FCC to process(!).

Understandably, cable operators were irate that the FCC would sit on license applications for 'such a long period of time.' The FCC responded that 'as of December (1977) they received 26 applications that month, but managed to grant 40 licenses.' In other words, "... are catching up with the backlog . . .".

While these new elements were in the pot, HBO was getting uncomfortable with RCA. RCA's admission that F2 was not capable of handling CATV growth upset HBO. HBO would have preferred, one suspects in hindsight, that RCA simply not allow cable to grow beyond ten or so transponders **on the one bird**. That would have made it difficult for Showtime, for example, to get a satellite berth, on 'The' cable bird. RCA wanted all of the cable business it could get, and it had a different perspective. HBO began talking with Western Union and the cable industry was 'abuzz' with the possibility that **HBO might move off of Satcom** to Westar. The consensus was that wherever HBO went, that's where the CATV dishes would point. And if you were CBN or WTCG or somebody else, you'd better move with HBO if you wanted any cable systems to carry you. One bird for cable; one dish per cable system was the scenario early in 1978.

RCA and HBO 'made up' and HBO got a very comfortable 'deal' with RCA. Only they know the terms, of course. As the moving day from F2 to F1 approached



**SHOWTIME** joined HBO on March 7, 1978 and doubled the number of premium program choices for the handful of 'private terminal' viewers.

(May 31, 1978) here is how the transponder loading on F2 lined up:

- 1) **RCA F2/ 119° west.**
  - TR2 / **PTL**
  - TR4 / **Showtime** (east)
  - TR6 / **WTBN** (later to be WTBS)
  - TR8 / **CBN**
  - TR10/ **Showtime** (west)
  - TR14/ **Trinity Broadcasting** (KTBN, religion)
  - TR20/ **HBO** (west)
  - TR22/ **Madison Square Garden**
  - TR24/ **HBO** (east)

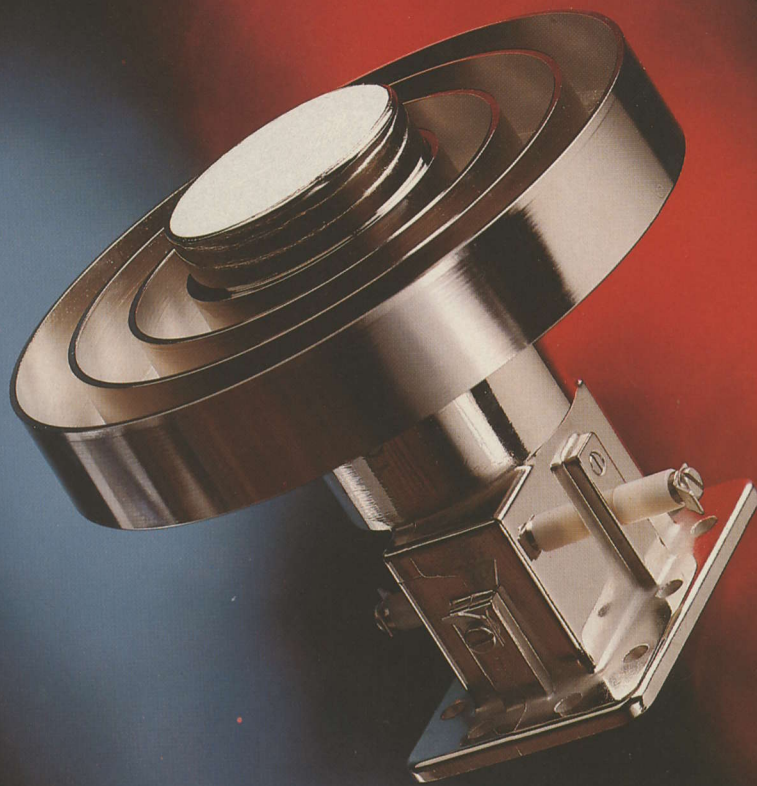
Transponder 12 was 'broken' on F2, and TRs 16 and 18 would be activated **after** the F1 move. In all honesty, the viewing selection was certainly growing but it was not all THAT great even in mid-1978. The big growth was still to come.

But 'private terminal pressures' were building. The April (1978) issue of **CATJ** front-covered the question '**Private Terminals / A Thaw?**' and then devoted 12 pages to the statement '**Private Terminals Are Becoming An International Phenomenon.**' The 'issue' was far less important than **CATJ** indicated but the 12 page 'focus' on pioneering terminals (including Steve Birkill in England) awakened some new hostilities in the cable arena. The article 'intimated' that hundreds of US private terminals were in operation (the number was probably closer to 15) and suggested that several new suppliers were entering the field. The article was at least a year premature but it served to draw attention to the possible long term ramifications of the exploding new technology nonetheless.

If 'writing about it' could make it real, the summer of 1978 saw a new onslaught in private terminal interest. Let it be understood that at most, there may have been 15 at the time. It was in the summer of 1978 that the



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amplifies the signal and tunes the transponder. Using advanced technology GaAsFET, the LNC provides low noise temperatures.

## THE SECOND DOWN

converter is housed in an industrial-strength and weatherproof, O-ring sealed casting. This unit provides \*Polarotor™ I interface.

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\*Polarotor is a trademark of Chaparral Communications, Inc.



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Satellite Earth Stations  
P.O. Box 160  
Mamou, LA 70554  
(318) 468-2203

Starview of Texas  
12331 N. Central Expressway  
Dallas, TX 75243  
(214) 934-9126



## EARLY TVRO/ continued from page 34

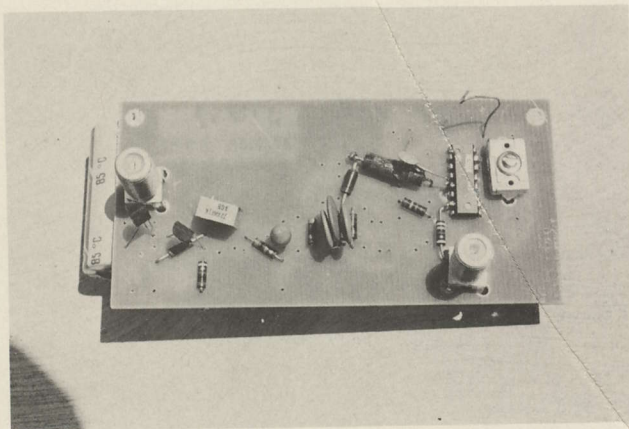
leading proponents of 'home, private TVROs' happened to get together in Oklahoma. The occasion was a cable seminar hosted by CATA; the Community Antenna Television Association.

England's **Steve Birkill** was there, as was Canada's **Rod Wheeler**. Oklahoma's Bob Cooper and Steve Richey were also on hand. Wheeler and Richey used the occasion to join forces; Richey would design and build 'home' TVRO receivers and Wheeler would sell them. Wheeler, no slouch at design work, would make considerable contributions to the final receiver design.

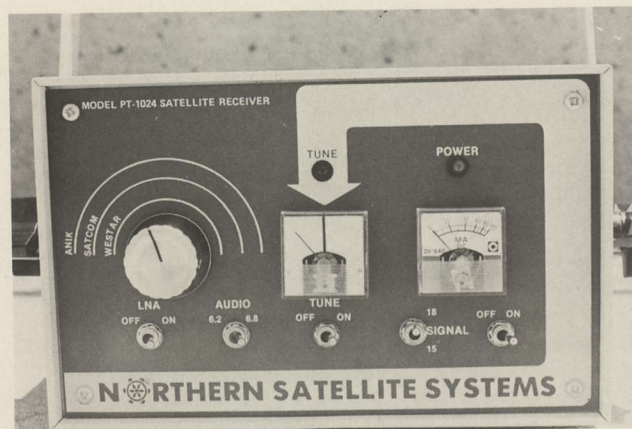
Birkill used the occasion to build and demonstrate his latest 'toy,' a 'phase locked loop demodulator' which greatly simplified the art of taking a 70 MHz 'IF' signal and turning it into a television picture. It was in Cooper's basement Lab on Thursday July 13th that Birkill connected his PLL demod to the 70 MHz 'output' on a Microdyne 1100 satellite receiver and the first North American demonstration of a PLL demod was history.

If there was a 'starting place' for pure home technology, it was during that mid-July meeting in 1978. Although the first Richey/Wheeler home receiver had only 10 produced, those ten infected dozens of other industry start-up pioneers. Among those who were in Oklahoma at the time and who would, over the 'long week' become exposed, and possibly infected for life, were:

- 1) Wheeler, Richey and Birkill, plus,
- 2) **Bob Behar** who would later form **Hero Communications**,
- 3) **Royden Freeland** who would produce, through his **International Crystal Manufacturing** the first true 'production line' home TVRO receiver,
- 4) **Tom Humpheries** who would later head up the first **M/A COM** entry into the home TVRO field, and,
- 5) **Pete Warren** who had earlier tried (and failed) to



**THE FIRST/** This is the Steve Birkill PLL demodulator he built in Steve Richey's shop while visiting in Oklahoma in July of 1978. Connected to a Microdyne TVRO receiver, he showed Richey, Wheeler and Coop how the new concept worked. TVRO demodulators would never be the same again.



**THE FIRST/** the very first commercially built 'home TVRO receiver' was the product of the combined talents of engineer Steve Richey and designer/marketeer Rod Wheeler. It had a separate LNA powering line (all LNAs had separate power lines then), both 6.2 and 6.8 MHz audio, an AFC system that allowed you to tune with the AFC 'off' and then 'switch on' for stable reception, and metering of internal power supply voltages. It was about 12 months ahead of its time, and only ten were produced. One, today, would be worth a fortune as a collector's item.

bring out a low cost receiver.

The mixture and the exchanges were 'electric.' Richey made 'the mistake' of setting his and Wheeler's new receiver out on a table in his display in the cable trade exhibit with a price tag on it. The price tag was several thousand dollars LOWER THAN the least expensive CATV satellite receiver at the time. That did not endear Richey to the cable satellite supplier crowd and within hours he would remove the receiver from the table and hide it away for the balance of the show. He couldn't take the heat from the balance of the suppliers who suggested he was 'crazy to ruin a good market' with such a dramatic, one-step price reduction.

Like the one-year earlier Pete Warren experience at the same cable group show (reducing cable TVRO system prices from \$15,000 to \$12,000 in one jump), the world never quite recovered from that exposure. Enough cable operators had seen Richey's receiver to know that the day of \$4,000 and up satellite receivers was rapidly drawing to a close.

All of these events interplayed. It was in the early spring of 1978 that really small dishes (ten foot and then six foot) had been proven (see next chapter; 'The First Legal TVRO'). Small dishes made some people nervous, but most accepted that if they would work, that would simply mean a larger market for terminals. The **de-escalation of receiver pricing was another matter.** The very strong belief, among the handful of receiver manufacturers, was that if you could get \$4,000 for a receiver that cost you \$1,000 to build, you should keep doing it for as long as you could. The Richey and the earlier Warren receivers threatened some very profitable 'cash cows' and the people who owned those cows (S-A, Microdyne and M/A COM) were in a pretty big league. They did not like what they saw and minced no



words in saying so.

While equipment was getting better and cheaper, the first of the big name promotions were getting underway. A group calling itself **ASN** (American Satellite Network) wanted to bring up a three to five channel service on Westar 2, offering New York's **WOR**, Chicago's **WGN** and Los Angeles indie **KTTV**. To this they wanted to **add** a 'sports channel' (ESPN was not yet created) **plus** a movie channel. That plan would ultimately fail, as would the next to be described.

**Holiday Inns of America** (remember the private terminal for the Chairman of the Board), 20th Century Fox and Southern Satellite Systems (the company that brought WTCG/WTBN/WTBS to the bird) had formed a new company in mid-1978; they were going to program, on F1, **a special channel** for the delivery of movies and specials **solely to motels and hotels**. This was not a Holiday Inn plan (which involved HBO); this was to be a stand-alone channel just for motels and hotels. Added to the group was Bell and Howell, the nationwide electronics service firm. Eighty motel sites were initially selected and there was a target goal of '40,000 motel rooms' for late 1978 operation.

The plan never got off the ground but it started something else; it got business people thinking about using satellites for far more than simply interconnecting **cable** programmers to **cable** systems. Hundreds of additional plans would be created in the years ahead, and some (such as the Hospital Satellite Network) would actually 'make it.'

The latter half of 1978 was marked with new monthly (weekly, daily) revelations from dozens of groups who wanted a piece of the satellite 'pie.' There was, for example, a group that planned (and announced) a 'national network of television translators,' all interconnected via satellite, to PTL. Hundreds, thousands of such systems were planned.

What all of these announcements and plans had in common was this:



**ED TAYLOR** of Southern Satellite Systems had 1.5 million homes watching WTBS by mid-1978; a far cry from today's 30,000,000 cable homes! Taylor's firm would later launch KTVU, SPN and a host of other cable-creative services.

*Due to a delay in the installation of our first affiliate earth station, regular programming on Home Theater Network will now begin on September 18, 1978.*

**NOT EVERYONE** (in fact, not many) made it 'on time' as scheduled. Home Theater Network, the first 'G Rated' movie service had their problems getting going. Yup, they had 'one affiliate' to start and could see no point in starting programming until that affiliate had its TVRO installed!

- 1) Each would require **hundreds** of small dish antennas; and it was plain that ten foot dishes, if not smaller, would work in many areas;
- 2) Each would require LNAs and receivers, **lower priced** receivers, one assumed, than were available in mid-1978;
- 3) But most of all, to the FCC, **all** of these terminal systems plus the still 'alive' Mutual (and ABC) radio networking terminals would require FCC licensing. **And that scared the FCC to death!**

There was another 'scare' in that period as well; substantial evidence suggested that RCA had a '**sick bird**' on their hands!

After cable moved from F2 to F1, it took a few weeks for the cable operators to get their dishes properly zeroed in on F1. Then it began. A series of unexplained outages; the F1 signal would suddenly drop in level, or perhaps even disappear totally. One, on June 21st, 1978 was so severe and long lasting that in no time the cable industry 'believed' it had been suckered into moving to a bird that was not long for this world; or any other world. It would be late in 1978 before RCA adequately explained the mysterious F1 signal outages, and in that explanation came out the basis for the 'sick bird' story that cable was now convinced was true; **F2**, the bird cable had just abandoned, was in truth suffering from a number of severe problems. Later F2 would take a tumble or two in orbit and cable would be relieved that it had moved to F1.

These were exciting days with new developments and announcements at a mind-boggling pace. But it was only the beginning for private terminals which had virtually all of its excitement still ahead!



## FIRST TVRO/

THE STORY OF THE FIRST  
'LEGAL' TVROs

## A CHANCE To Prove . . .

While commercial interests, such as the proposed hotel/motel network put together by Southern Satellite Systems and Holiday Inns of America, were clearly interested in the opportunities presented by smaller and smaller (TVRO) antenna systems, there was a dedicated program in that area as early as 1977.

The FCC, with their 'nine meter rule,' pretty well eliminated any 'natural interest' in small terminals; even IF they would work, as long as they could not be 'licensed' you could not use them; **so why try?** Of course there were those who foresaw the day when licensing would not be required and towards that end, a foundation of data using smaller (and smaller) antennas was clearly needed.

The concept of a 'CATJ Lab' began in 1975. When Scientific Atlanta's **Henry Marron** made his now (in)famous statement about placing a 12 foot dish in his backyard, the wheels began to grind. That it 'was Marron' saying this, that he at least 'felt' that a smaller antenna would work, was significant.

Rounding up the hardware was no simple task. There were several options; **Taylor Howard's** first system used something called the 'Telco TD-2' microwave package. Years later, **Robert Coleman** in South Caroli-

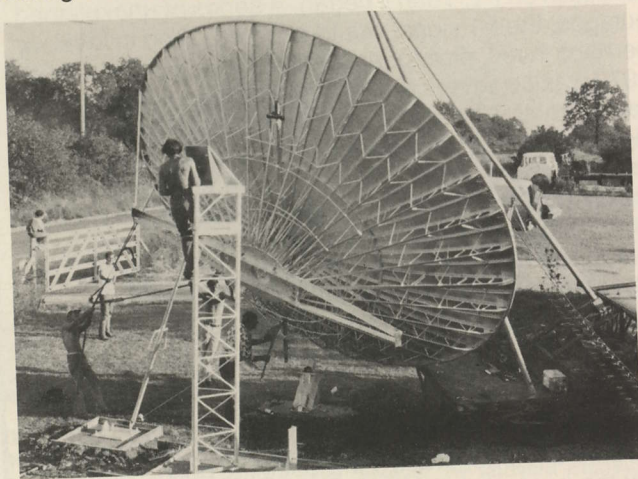
na would start out in the same way. The TD-2 was a surplus piece of microwave electronics which downconverted the 4 GHz microwave band to 70 MHz; just as our present day single conversion TVRO receivers do. It was big, bulky, difficult to operate (i.e. tune from channel to channel), but it worked very well for 1950 technology. It was an option.

But it was not the 'best option.' The goal, of the Lab, was to create 'limits' to minimum antenna size. A long round of letters, between **CATJ Magazine** and the FCC established that the number one purpose of the Lab 'system' was to determine, accurately, just how small antennas could be and still produce high quality television. (High quality was a nebulous phrase then, as now; translated it meant 'pictures people would watch'.) Clearly, only the 'best' of the then-current LNAs, feeds and receivers would be employed since the 'limits of technology,' or the 'state-of-the-art' was the objective here.

The FCC procedure for licensing such a venture was buried in old rules; a little used section that allowed the establishment of an 'experimental/developmental station,' with a license, to conduct experiments. The license was granted only when the applicant met the goals of the 'experimental/developmental' program. Annual written reports, relating the experiments attempted and the results produced, were required with the license. Renewal of the license was hardly automatic and in fact the CATJ license would not be renewed since by its one year renewal the FCC would have all but decided that all licensing for TVROs would become optional.

**WF-92** are call letters that were never 'transmitted.' They were mandatory however since every Commission licensee had to have call letters; just for filing purposes.

The Lab was funded out of Coop's pocket and from a modest budget made possible by the publication of **CATJ Magazine**. The first problem was the basic equipment; a dish (a 20 footer was the first installed), the receiver (a Microdyne was the first) and an LNA (a 180 degree SCI unit which was, at the time, 'state of the art!'). They would total around \$18,000. The budget was



HEAVE-HO/ the first 20 footer at CATJ LAB is lifted onto the USTC polar mount at about 5 PM on September 21, 1977.



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not THAT large!

But each of the firms involved did have products they wished to advertise in CATJ Magazine because CATJ was the stellar publication reaching the satellite-cable market. Each of the firms agreed to exchange their equipment for equal value in advertising space in CATJ. It was an arrangement that was approached with some nervousness but each participant understood the long-term ramifications of the 'Lab'; IF the Lab did what it hoped to do.

The 20 footer installed (See **Coop's Comments**, this issue) routinely, and promptly became a fixture. It was difficult NOT to get good service from a quality 20 footer; even in 1977! The next antenna to be tried would be a 12 footer. Henry Marron's words were still echoing in our ears, from two years prior. This presented the first obstacle; the 12 foot choices were products from Anixter-Mark, Prodelin and Scientific-Atlanta. All were in the \$6,000 region and each would cost upwards of \$1,000 just for crating and shipping. Since none of the firms shared the vision of a small antenna 'market,' exchanging the product for advertising was 'out.' Hard cash was the only possibility.

It was during the budget-balancing process that a slightly used ten foot Prodelin, one-piece antenna came into view. For just over \$2,000, it could be delivered to Oklahoma. The 12 foot plans were abandoned and CATJ picked up the expense of the 10 footer with the understanding that if it worked as we hoped, after the tests it would be promptly re-sold and installed as a private, home system for a cable entrepreneur in Oklahoma.

The concept was straightforward; invest the \$2,000, conduct the tests, sell the antenna off and re-invest the money in a next-size down antenna; an 8 footer.

The initial test results at WF-92 with the Prodelin ten footer were superb. Using then operational F2, not even a hint of sparklies was detected on any of the F2 trans-



**LAB SYSTEM/** complex television processing and analysis equipment at CATJ LAB was frequently utilized by major TVRO receiver suppliers to conduct side-by-side comparison tests of early commercial TVRO receivers. Hughes, S/A, Microdyne, Microwave Associates, SCI . . . they all brought their latest 'satellite video' receivers to the Lab for testing.



**TONY BICKEL**, the first supplier of 'feed horns' to the cable and early home TVRO industry, adjusts declination on CATJ Lab 10 footer; Yup, that's a 29 cent protractor, a piece of string, and a pair of vice grips as a weight he is using to read the dish angle!

ponders. The system was so impressive that it was mounted on a trailer and carried 40 miles to a local state cable convention where it was set up and made operational. That was in January of 1978. Several cable firms, operating relatively small cable systems in Oklahoma at the time, subsequently installed the same exact ten foot Prodelin antenna system for their cable firms. They did so by 'fudging' on their FCC applications, specifying larger 4.5 or 5 meter dish antennas in their license applications and then when receiving their license, **actually installing the smaller dish.** By April or May of 1978, the first 'licensed' cable firms, using ten foot dishes, were in operation; even if somehow their 15 foot-licensed terminals 'looked' far smaller than that!

The next step was the 8 foot size plateau. The anticipated delivery was quite long and there, laying on the ground adjacent to the 20 foot dish, was a 6 foot (Prodelin) dish which had been acquired in mid-1976 'at a good price.' Rather than waiting for the long schedule for the 8 footer, the six footer was installed on a test stand (an early, perhaps 'the first,' pole mount for a TVRO antenna; see page 171 here). The results on F2 were



# ODOM.

## The one the others copy.



Some enterprising people out there have found that it's a cinch to make an antenna that LOOKS LIKE an Odom.

You simply buy an Odom antenna and copy its shape. To save more time and money, you stamp it out with a press.

You certainly don't waste money designing the master plugs from scratch, by computer, like Odom does. Or hand-layering the fiberglass and resins, like Odom does. And why go to all the trouble of flame-spraying a reflective layer of molten zinc, when you can just sandwich in some aluminum mesh?

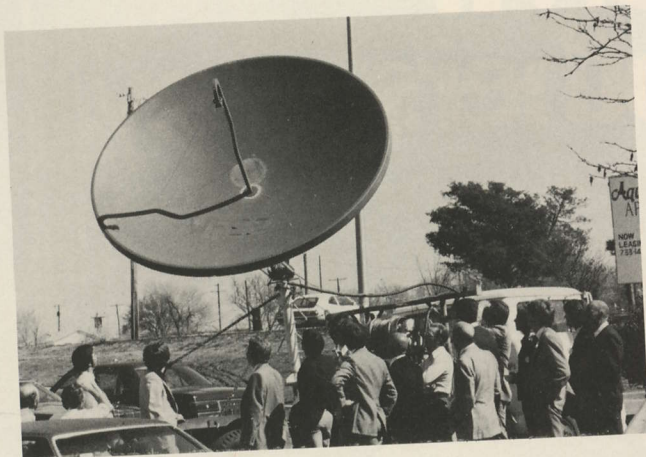
Your customers can tell you why. Because they'll see the difference. Not by looking at the antenna, but by looking at their TV sets.

Others may try to copy the Odom shape. But they'll never copy Odom performance. And to your customers, performance is what really matters.

Dial 1-800-643-2950 for the facts on Odom's complete line of TVRO components. In Arkansas, dial (501) 882-6485. It's **SOME DISH.**

 **ODOM**  
**ANTENNAS, INC.**  
The one the others copy.





WF-92/ TEN FOOT. Prodelin dish, showing 'mud stains' in center from storage in Oklahoma field, attracts a crowd at Oklahoma Cable show in the spring of 1978. Superb pictures and 'slightly illegal' cable system installations was the result.

watchable but hardly exciting. These points need to be made:

- 1) The LNA was a **180 degree** SCI: a good LNA, one of the best available at the time, but hardly the equal to today's 85 or 100 degree units;
- 2) The receiver was a **Microdyne 1100** series; an excellent receiver for high quality video (and audio), but hardly the sensitivity equal to today's home style or commercial receivers.
- 3) The EIRP from F2, in Oklahoma, on the F2 transponders was in the **34 dBw** region.

The dish was man-handled east to the Westar I slot where, they claimed, EIRPs in the 35.5 to 36 dBw region existed. How would it work there?

The results were exciting and surprising; pictures equivalent to today's high quality 5 and 6 footers resulted on the better of the PBS transponders on W1. And that was in February of 1978. The results were documented and the six footer continued to provide



TURNER IN '78/ WTCG from the WF-92 ten footer showed 'great promise.'



**CABLE SATELLITE MAGAZINE/** aired weekly for 80 weeks and attempted to keep the cable (and later, private) TVRO industry up to date on new equipment, techniques and services.

service, and serve as a proving ground for new receivers over the next 18 months.

Voluminous reports on the testing and the results were published in CATJ. We didn't REALLY need to file a written report with the FCC; they subscribed to and routinely devoured CATJ and were well aware that the testing was proceeding at an encouraging pace. Out of the 'Lab System' came a few other noteworthy projects which ultimately would have some bearing on the growth of early TVRO.

- 1) **Cable Satellite Magazine** was a television program created by Coop starting in the fall of 1978. The program was an hour long and it was created at the **University of Oklahoma** School for Broadcast Journalism. Two, new, hour long shows were produced each month from October through June. Each show repeated one additional time so the program aired weekly. During the summer months, 'summer re-runs' or a substitute program produced by **Dana Atchley, III** ran.

Cable Satellite Magazine was a 'video magazine' designed to communicate to cable television system operators the latest in cable and satellite technology. A heavy 'field taping schedule' saw a crew headed up by Dana Atchley traveling widely all across the U.S. to create field visits to cable systems, satellite firms and in one historic visit, a tour of the RCA 'uplink facility' in northern New Jersey. Coop hosted the program and various industry technical gurus such as **J. Duke Brown** of Microwave Associates (now M/A COM) co-hosted on a rotating schedule.

The 40 or so 'Cable Satellite Magazine' hours pretty much portrayed every important facet of the early development of (low cost) TVRO through the years. **Taylor Howard's** first appearance was in May of 1979.

FIRST LEGAL TVRO/ continues on page 5



# MEET THE MANUFACTURER YOU DESIGNED.

## The First Complete 4 Foot C-Band Direct System

Funny, isn't it? In a business where it's so important to treat your customer right, when was the last time a manufacturer made *you* feel important?

When was the last time you didn't have to worry about back-ordered equipment? Out-of-the-box failures. Arbitrary distribution. Or sudden price increases that left you holding the bag.

And even when you could get the hardware you needed, how often have you found yourself in a bidding war, with everyone on the street selling the same package? Forcing you to cut your price—and margins—for the sake of a sale.

If all this sounds painfully familiar, maybe it's time you met people who believe in *solving* your problems, instead of creating them:



1.3 Meter - Computerized Single piece spun aluminum antenna featuring special "USAFCS Standards" alloys.

85°K - 60dB  
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## Nothing Sells Like a Demonstration

Many dealers find that an in-home demonstration is the best way to close a sale, and sales figures confirm that dealers using trailers do sell more systems.

Channel Master trailers feature a heavy-duty chassis with a low center of gravity for good stability on the road. All models include a tie-down kit and leveling jacks, compass, clinometer and carrier level detector.

Single axle trailers are available with 8-or 10-foot dishes on monopole mounts.

Double axle trailers are available with 10-and 12-foot dishes on tripod mounts.

*Single axle trailer with 8-foot dish*

*Double axle trailer shown at left*



*Ten foot SMC dish on a Deluxe Tripod Mount*

## Quality in Every Detail

### Precision Reflectors

Highly consistent SMC Fabrication used for eight-and ten-foot Channel Master dishes produces maximum accuracy for superior 2° performance — guaranteed in writing! Interchangeable sections, machine set and drilled, assure you of easy match-up and assembly.

Twelve-foot and 2 meter (6'8") CM dishes are made using the high-quality RTM, resin transfer molded, process. Twelve-foot models are similarly guaranteed for 2° orbital spacing.

### Stable Feed Support

Aircraft aluminum struts anchored through the dish provide perfectly balanced and vibration-free support. Only the tiny polarizer probe rotates.

### DURABILITY ASSURED WITH:

- All Stainless Steel Hardware
- Aircraft Aluminum Support Struts
- Steel Mount with Baked-On Finish
- Die-Cast Aluminum Feed and LNA
- Feed Assembly Cover

### Polar Design Mount Assembly

Provides full domestic satellite arc coverage with just a single manual or motorized adjustment.

**Monopole** models feature unique "pole-within-a-pole" construction that gives them a neat, clean appearance while also maintaining a high degree of strength and stability — plus, easy installation on a single column.

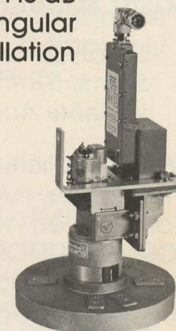
**Heavy-Duty** mount systems give CM ten-and twelve-foot dishes superior stability on all types of terrain. Their tripod-pedestal base has been wind-tunnel-tested to over 100 mph!

### Scaler Design Feed Assembly

This die-cast scaler feed horn features reduced spillover for minimum interference and noise pickup, and optimizes antenna gain with .5 dB improvement over conventional rectangular feeds. Factory calibrated for ease of installation and optimum dish performance.

### Automatic Polarizer

Gives dual polarity reception without cumbersome feed rotation or dual LNAs. Probe automatically assumes correct horizontal or vertical position with remote channel selection.





# Channel Master Satellite Systems.... A Standard of

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### Model 6130

#### Deluxe Satellite Receiver with Remote Control

- Wireless, Infrared Remote Control
- LED Signal Strength, Fine Tune & Channel Display
- Automatic Polarity Switching

Ensure customer satisfaction with the convenience of WIRELESS REMOTE CONTROL. The CM-6130 provides remote On/Off control, plus channel selection, using simple UP/DOWN CHANNEL SELECT buttons identical to those found on the receiver. AUTOMATIC POLARITY SWITCHING allows your customers to select any channel by using just one button — eliminating extra polarity adjustments. Channel numbers are clearly shown on the receiver's LED DIGITAL DISPLAY.



Give your customers maximum reception control with professional features like LED SIGNAL STRENGTH graph lights and VIDEO FINE TUNE CONTROL with its own LED display. PRIORITY and VARIABLE AUDIO TUNING customize reception even further, and the choice of MODULATED or BASE BAND OUTPUT adds extra versatility for either standard TV or, monitor and VCR viewing.

### Model 6129

#### Standard Satellite Receiver

- Push Button Channel Select
- Signal Strength Meter
- Audio and Video Fine Tune Control

The CM-6129, our best-selling receiver. Easy-to-use CHANNEL SELECT buttons provide your customers with sure and accurate channel selection. The POLARITY INDICATOR light gives constant indication of vertical or horizontal orientation.

For extra accuracy, the SIGNAL STRENGTH METER lets your customers see the changes in signal level while locating



a satellite. And if more picture adjustment is required, the FINE TUNE control can also be used.

This receiver also features VIDEO and AUDIO OUTPUTS for direct hookup to VCRs or TV monitors, plus a SUBCARRIER OUTPUT for use with stereo processors.

### Model 6131

#### Basic Satellite Receiver

- Color-Coded Polarity and Channel Select
- Signal Strength Meter
- Variable Audio Tuning

When simplicity makes the sale, choose the CM-6131. The easy-to-use rotary CHANNEL SELECT DIAL features two color-coded scales for simple channel selection. The FORMAT BUTTON allows the normal selection of channels on reverse polarity satellites such as Westar and Galaxy. The SIGNAL STRENGTH METER gives the relative strength of the received satellite signal, and is provided for assistance in centering the dish on the desired satellite.



Finally, for maximum compatibility, a choice of BASE BAND OUTPUT for VCRs and monitors or, a built-in channel 2/3 modulated output for regular TV sets is provided on the back of the receiver.

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## ACCURATE SATSCAN ANTENNA DRIVES

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### CM-6251 Programmable Satscan

- Microprocessor Controlled • Touch-Sensitive Key Pad • Coded Parental Control Lock

### CM-6253 Solid State Satscan

- Continuous LED Digital Readout • Solid-State Push Button Controls • Satellite Locator Reference Card

### CM-6252 Infrared Satscan

- Hand-Held Remote Control • Plus the Same Features as the CM-6253



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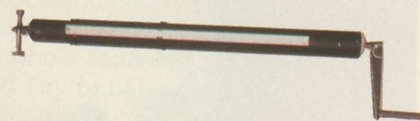
**RELIABLE REPUTATION:** Practically overnight, hundreds of small new companies have sprung up to take advantage of the "satellite boom." Many will fail as fast as they started. Recognized for over 35 years for the high quality and performance of its TV reception equipment, Channel Master is a well established organization with a nation-wide network of distributors that you can depend on.

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Calibrated hour-angle jack for manual systems provides constant reference for accurate relocation. Completely wear and weather protected.

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A SUBSIDIARY OF AVNET, INC. • BOX 1416 • INDUSTRIAL PARK DRIVE • SMITHFIELD, NORTH CAROLINA 27577



EARLY TVRO/ continued from page 44

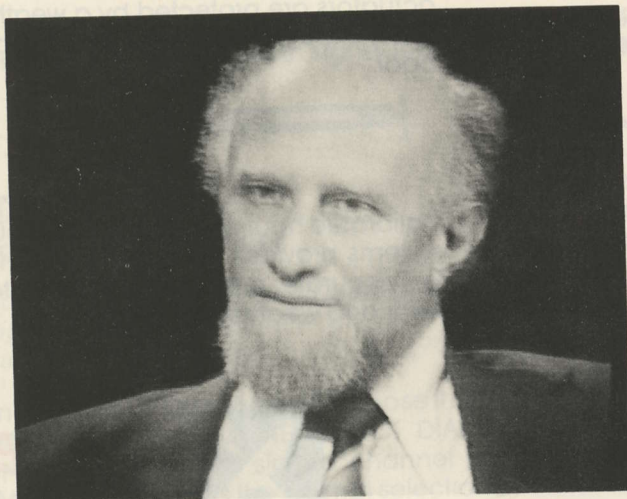
**Robert Coleman's** first appearance was in the same month. Antenna pioneer **Oliver Swan** (he created the spherical antenna for TVRO) ran through 1978 and 1979. The program had studio guests and a representative from Scientific-Atlanta who, on the program, made the first 'public announcement' of the Scientific-Atlanta 'HOMESAT'® marketing plan.

Cable Satellite Magazine initially aired on an HBO transponder (24) on F1. That was in a period when HBO did not 'sign-on' with its day's programming until around 2 PM eastern time and you could 'squeeze in' at noon on the same transponder and reach a very wide cable-system audience. When HBO expanded its operating hours, Cable Satellite Magazine moved to a transponder owned by the **Satellite Program Network (SPN)**; TR21 on F1. This was when SPN was just getting started and their total broadcast day was also but 12 hours. The program continued until the fall of 1979, eventually leaving the air when SPN's own broadcast day grew to be 24 hours per day.

The subtle hardware problems facing an early day pioneer were many. For example, LNAs in that era were NOT powered through the coaxial cable. And down-converters were NOT installed at the dish; they were an integrated part of the receiver proper. You had a 50 dB gain LNA, at the feed, and you connected your 4 GHz output (amplified) signals to the receiver proper through some often considerable length of  $\frac{7}{8}$ " (Helix®) low loss coaxial line. If you think installing RG-6/U is now a pain, you should have been around THEN when coaxial line nearly an inch in diameter was used!

The LNAs had a separate power plug on them and to make them power you installed a separate power line from an indoor power source to the LNA. Romex, or some other low-loss, relatively large diameter line was typically used; because we didn't know any better(!).

It was not until June of 1978 that any REGULAR use



SIX FOOT VIDEO/ PBS service in Oklahoma, perhaps in 35.5 dBw EIRP region, produced excellent pictures even with 180 degree LNA.

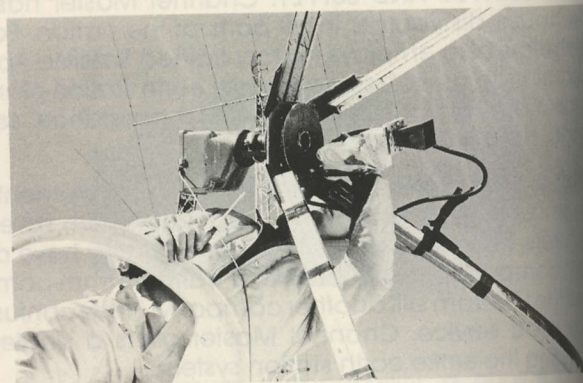


CABLE SATELLITE MAGAZINE field production crew, led by Dana Atchley, III (right) 'on location' in Bisbee, Arizona with Oliver Swan (barely visible in doorway to equipment shed). More than a hundred hours of 'field video' was shot in two years time.

was made of the opposite (vertical side) polarization. Up to that point, Western Union birds had but 12 channels and all were horizontal; and RCA had elected to put 'video on horizontal' and message traffic 'on vertical.' It was in the first month of 1978 that RCA began shipping television programming to Alaska on (vertical) transponder 23 on F2. Understand that there was no such thing as a Polarotor®. If you wanted to 'rotate' your feed to a new (different) polarization, you had to climb a ladder, loosen some bolts, and physically twist the LNA plus feed on the pipe mount.

The first solution to this 'problem,' installed one wintry day in early 1978 at the 'Lab,' was to take the feed and LNA off of the mount and then rebuild the mount so that a common garden-variety **television antenna rotor** could be installed as a mount for the LNA plus feed. It happened, by coincidence, that the antenna rotor chosen for this first installation was manufactured by a firm that would later become a major marketing force in home TVRO systems; **Channel Master**.

The system, simple, relatively foolproof, and not very high-tech, served as 'the model' for the rotation of TVRO feeds clear through the 1981 introduction of the



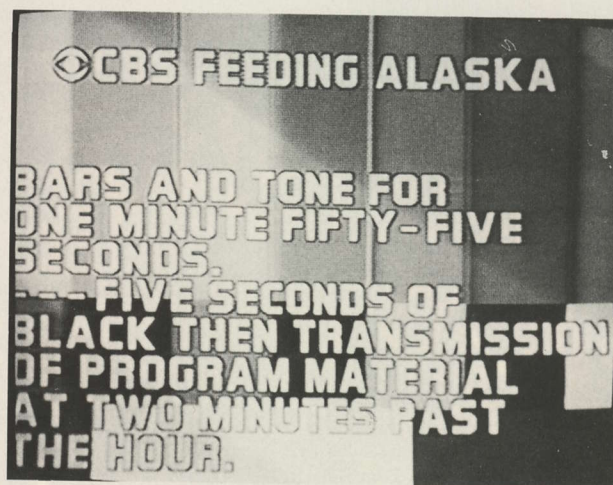
FIRST POLARIZATION-ROTOR is installed at CATJ LAB by Gaylan Bockhahn; a Channel Master TV antenna rotor!



original polarization rotation probe systems introduced to our industry.

The 'CATJ Lab' was the first, legal and licensed, home or private TVRO installation in North America. It had a specific purpose and it accomplished that purpose. Its work **proved** that small aperture dish antennas **would work** and it established the limits of small dish size, given the technology of 1978-1979. It also became a focal point for a considerable amount of publicity for the new technology serving as a location where dozens of national and international magazines and television program producers came to explore this new technology and what it might one day mean to the world.

But when all of this 'hype' was cut away, it was really Bob Cooper's home and it also provided the Cooper family with the first national experience in 'adjusting to' having a dial filled with exotic television program services in the home. The work it did may not ultimately have very much bearing on the form this industry takes, but the impressions it left on the Cooper family will remain for a lifetime.



CBS (and others) were feeding network programs to Alaska on F2's TR23 in this era; where the programs were taped for delayed showing.

## LEGAL TVROs/

## THE STORY OF HOW TVRO ESCAPED 'THE LAW'

The TVRO scene drifted from the first terminals in 1977 to the fall of 1979 with no formal FCC activity save the granting of a handful of the 'experimental/developmental' licenses. Most of those went to people who were visible users of (private) TVROs; including one to **Ted Turner**. The FCC KNEW this was no solution, and they also knew that probably as soon as the fall of 1979, they would be 'forced' to deal with the entire licensing issue, head on. Here is how the forces shaped up:

- 1) Private terminals existed (the FCC **thought** them to number in the low thousands by the fall of 1979; there **may have been** 200) and they had no licenses. The FCC could turn either of two ways: (1) Engage in a crack down activity and shut some down, confiscating the equipment and perhaps attempting prosecution of the operators, or, (2) Abandon the licensing altogether.
- 2) Mutual Radio, and then ABC, said they wanted as many as 1,000 ten foot terminals for ARO (audio only radio reception). The FCC had two or perhaps three choices here: (1) Require each to

obtain a license, which would have made their staffing requirements increase by at least 400%, or, (2) Grant some 'new type' of blanket license to Mutual and ABC (and others sure to follow) and let the master licensees do the paper work, or, (3) Abandon the whole licensing program.

- 3) People like **Ed Taylor** of Southern Satellite Systems were talking about establishing thousands of small (10 foot) TV receive only terminals at motels and hotels from coast to coast. Here again, the options were (1) Require each to obtain a license, (2) Grant a master license to each major player and tell them to do the individual paper work for each individual terminal, or, (3) Abandon the licensing altogether.

Numerous 'Petitions' to abandon the licensing, either altogether or at least to make it 'optional' were before the Commission. They had the 'vehicle' in their garage; all that was required was for them to put in some gas and drive it away.

On October 18, 1979, the FCC did the clear, ration-



# SURVIVAL OF THE F

Two white electronic components are displayed against a dark blue background. The smaller unit in the foreground is a rectangular box with a label that reads "LOCOM 3.7-4.2 GHz GAAZ FE1 LOW NOISE BLOCK CONVERTER". It also features a small graph showing gain versus frequency. The larger unit behind it is a similar rectangular box with the "LOCOM RADIO SEMICONDUCTOR" logo on its side. Both units have connectors on their front faces.

**NEW PRODUCT - LNBC**

The new **LOCOM LNBC** (foreground)—an integrated system that combines superior performance of our LNA with our new frequency stable block converter—one easy-to-install unit.

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our high quality, c  
LOCOM LNAs/LN



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That's why we put each of our microwave components through a brutal series of tests before shipment. Only the best make it.

We perform a commercial burn-in on every LNA and LNBC, plus stress and leak tests where the units are pressurized and checked underwater for pin-holes. We analyze the microwave performance, including linearity, gain and bandwidth from  $-10^{\circ}\text{F}$  to  $130^{\circ}\text{F}$ . And, we introduced the industry standard, HP 8970A Noise Figure Meter System, to develop accurate, reliable data on noise temperature.

The results are worth it...high reliability... low failure rate.

For those few that do experience field problems, call us. You'll talk directly with a microwave technician trained to isolate the problem quickly. If the problem still can't be resolved, our warranty provides guaranteed one-day repair or we will replace your LNA or LNBC with a new unit. This one-year warranty package covers every microwave component we sell.

Choose from a range of dependable LOCOM LNA or LNBC models, from  $120^{\circ}$  to  $75^{\circ}\text{NT}$ .

Whatever you choose, LOCOM provides quality performance for your TVRO systems.

You can rely on LOCOM to tough it out...where only the best survive.

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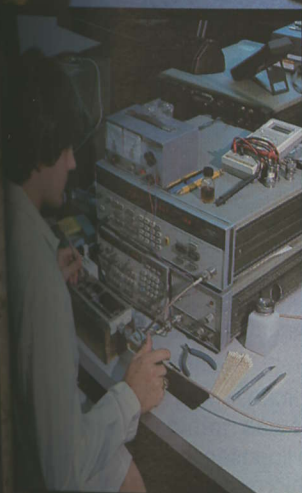
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Ongoing design engineering assures state-of-the-art technology in all LOCOM microwave components. Joseph Ray, Vice President of Manufacturing and Kingsley Hastings, President, review computer-aided design work in progress.

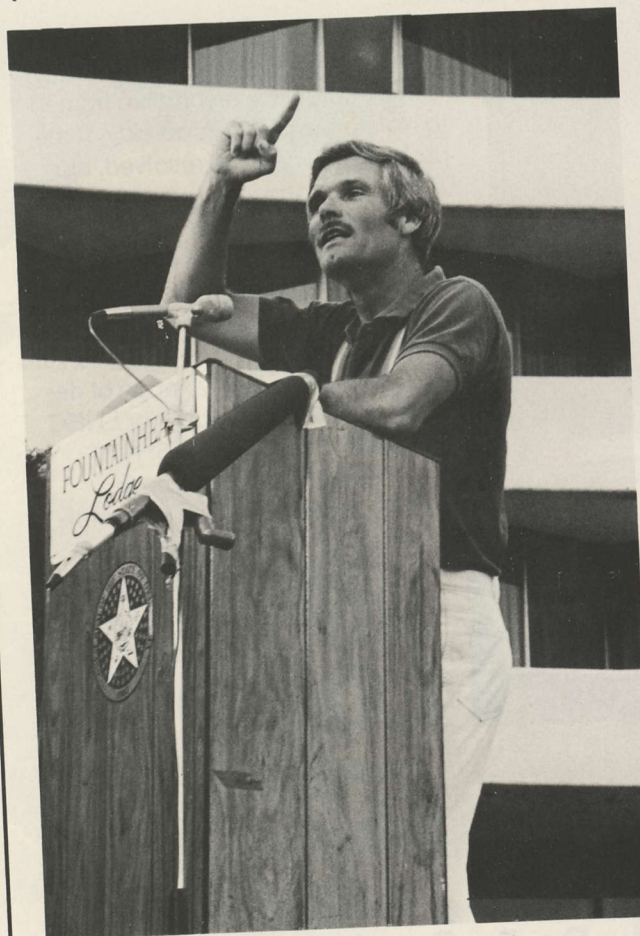


Exacting microwave alignment by our trained technicians produces our high quality, dependable LOCOM LNAs/LNBCs.





al thing; they addressed the issue head-on and after listening to a lengthy staff report and a set of staff-created options, they voted 7 - 0 to make licensing optional. Here is how it would work from that date



TURNER BROADCASTING'S Ted Turner was one of a handful to receive an FCC 'Experimental/Developmental License' in the 70's, for a private TVRO. He used his terminal to haul a trailer-mounted TVRO antenna with him around the country so he would never be 'far' from his beloved WTCG/WTBS!

forward:

- 1) Anyone who wished to install a 'small' TVRO or ARO could do so. If the terminal met all of the FCC's requirements for licensing, and if the applicant wished to file for a license, **one would be granted.**

In that event, the license 'bought' for the licensee privileged; that license was a form of second-hand guarantee that no future (terrestrial) microwave system (such systems cause today's 'TI' or terrestrial interference) would ever be licensed by the FCC in such a location where it would cause interference to the licen-

SHOWTIME

RECEIVED  
MAY 22 1979

May 17, 1979

Mr. Robert B. Cooper, Jr.  
CATJ Magazine  
Suite 106  
4209 NW 23rd  
Oklahoma City, Oklahoma 73107

Dear Bob:

By this letter we are responding to your request to allow your experimental/developmental earth station licensed by the FCC under the call sign WF92 to access our SATCOM F1 transponder under certain conditions:

- 1) WF92 is authorized to tune in our transponder (10 and 12 during SHOWTIME hours) for the express purpose of monitoring satellite television receive equipment (antennas, LNAs' receivers and associated hardware) at your laboratory site in Oklahoma, or elsewhere when you are conducting field tests.
- 2) WF92 is authorized to tune in our transponder (10 and 12 during SHOWTIME hours) when your WF92 is installed at 'trade shows' for the purpose of demonstrating to interested parties how television receive only terminals work, as a means of explaining the satellite television technology.

This is limited authorization, for test and experimental reception purposes only, and is not authorization for commercial display of any of our programming, and it may be revoked at any time by our firm with no advance notice.

Very truly yours,

*John J. Sae*  
John J. Sae  
Vice President  
Marketing & Affiliates

JJS:smt

SHOWTIME LETTER of 'approval', written for the CATJ Lab terminal application, was one of more than a dozen collected from program suppliers. Only HBO refused to grant Cooper such a letter.

see's system. In other words, a license was a 'ticket' or 'warranty' against interference. It was nothing else and even at that, it was the job of the licensee to 'police' any new applications for terrestrial microwave systems that might appear at the Commission and to file 'objections' to those license applications if the licensee felt the new proposed, systems could cause it interference.

- 2) Or, you could simply ignore the entire optional licensing program and install, as you wished, where you wished, and when you wished,



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national sales  
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CSD



UNITED STATES OF AMERICA  
FEDERAL COMMUNICATIONS COMMISSION  
RADIO STATION CONSTRUCTION PERMIT AND LICENSE

Domestic Fixed Satellite (Nature of Service) WF92 (Call Sign)  
Temporary Fixed Earth Station (Developmental) (Class of Station) 53-DSE-P/L-78 (File No.)

Licensee: ROBERT B. COOPER, d/b/a CATJ LABORATORY

Subject to the provisions of the Communications Act of 1934, the Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this permit and license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning February 6, 1978 (3 a.m. eastern standard time) and ending February 6, 1979 (3 a.m. eastern standard time).

Various Locations within the Contiguous States (Location of Station)

File No. 53-DSE-P.L-78

## 2. POINTS OF COMMUNICATION

The following space stations located in the geostationary satellite orbit:

KS30 (RCA SATCOM 1)  
KS31 (RCA SATCOM 11)

## 3. TRANSMITTING EQUIPMENT

Type	Output Power	Tolerance	Special Provisions
------	--------------	-----------	--------------------

NOT APPLICABLE TO RECEIVE-ONLY OPERATIONS

## 4. ANTENNA FACILITIES

(a) Communications Antenna No. 1.

Type . . . . . : 1.83 meter Diameter Parabolic Antenna

Frequency Range . . . . . : 3700-4200 MHz (Receive)

Antenna Gain . . . . . : 35.0 dBi at 3950 MHz

Beamwidth . . . . . : 3.02° at 3950 MHz

Polarization . . . . . : Linear circular with any orientation

Receiving System Noise Temperature . . . : 300°K at 4000 MHz

Page 3 of 8

FCC Form 456-F  
January 1976

**FCC DEVELOPMENTAL LICENSE granted to Bob Cooper's CATJ Lab was multi-paged document authorizing use of antenna receiving systems down to 6 feet in size. One unusual twist; license was good 'for any location within 48 states' and authorized 'public display of satellite television reception for demonstration and test purposes'.**

(small) TVRO or ARO.

In this event, the FCC's decision of October 18, 1979 made it very clear that your terminal not only had no protection guarantees against interference, BUT, if you installed a system and it operated interference free for some period of time, and then interference did develop (from a new or existing terrestrial microwave system), you had absolutely NO LEGAL RIGHTS to file a complaint with the FCC nor to ask the FCC to intervene in your defense. In other words, **without a license, you were not protected by the FCC.** With a license, you had a measure of protection.

The FCC clearly understood, as study of the text of that meeting shows, that they were, in effect, 'legalizing private, home TVROs' with their action. Some at the Commission that day spoke out about this and pondered what the action they were about to take might mean to other questions; such as 'Section 605'? The October 18th meeting elected to 'dodge' that issue, although a videotape of the meeting reveals that the FCC did intend for staff to 'make recommendations as to how Section 605 does or might affect these private home terminals', at a future date. That date has yet to come and Section 605, as antique as it is, remains an unknown factor in the ultimate development of TVRO in private homes.

There are these postscript observations, largely based upon common sense:

- 1) In matters such as this, in past decades, anytime the Federal Communications Commission felt 'challenged' it would 'crack down' on alleged violators even if ultimately the courts might overturn their enforcement activity.
- 2) The FCC had ample opportunity at their October 18, 1979 meeting to address the still unanswered questions pertaining to Section 605 of the Communications Act. They had more than ample opportunity in the interim years to do so. **They have not done so.**
- 3) When the Commission feels unsure of 'it's ground' and 'not motivated to act' in a new area, it often opts to allow whatever legal questions as may be raised by a 'new service' to be worked out in the courts and/or Congress. The Commission has seldom been a 'creator of new communications policy'; rather, its expertise is in the regulating or fine tuning of existing communications policy.

Home TVROs clearly required 'new communications policy.' There was no sound precedent for what they did nor the rapid growth of their use. Public policy questions are threaded in and out of the ownership and operation of every TVRO in America.

But most of all, the Commission has in past decades 'acted' only when there was 'clear-cut violation(s)' of existing rules, OR, when the activity of a Commission licensee was threatened or damaged by the new activity.

LEGAL TVRO/ continues on page 57



# WINEGARD'S CLEARLY SUPERIOR SEE-THROUGH DISH IS NOW AVAILABLE IN TEXAS FROM ELECTROTEX

Make the break from mesh to a higher quality see-through dish. Take a look at Winegard's perforated aluminum 10-footer. There's nothing else like it on the market.

Winegard's new dish has a sharp, clean look of quality. It's a new level of dish technology offering advantages other see-through dishes can't deliver. Like 39.5dB gain, F/D "Deep Dish" ratio of 0.283, lightweight yet rugged construction, super-simple assembly, weather protection, high performance and a look of class that your customers will appreciate. What more could you ask for? For more information stop by or call one of our Texas locations.



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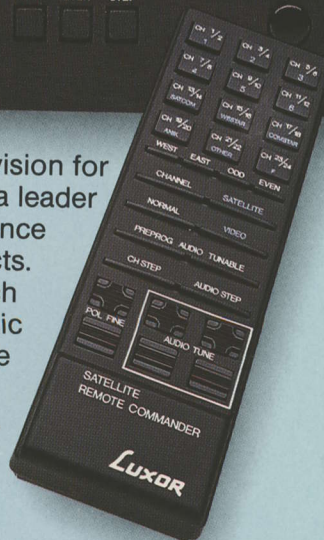
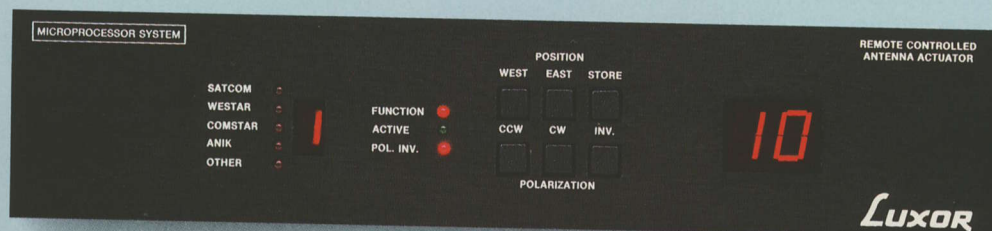
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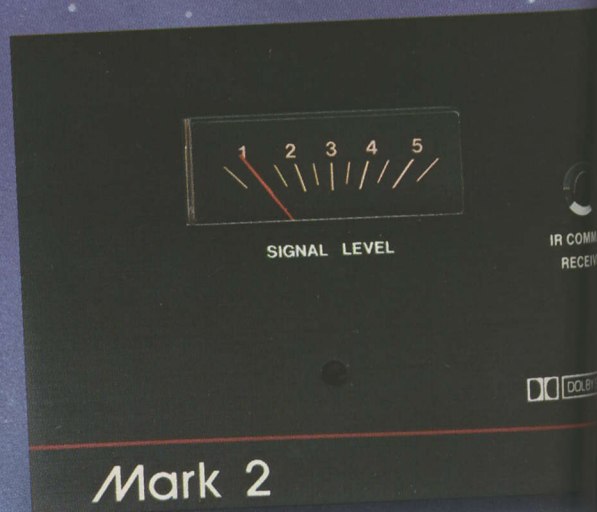
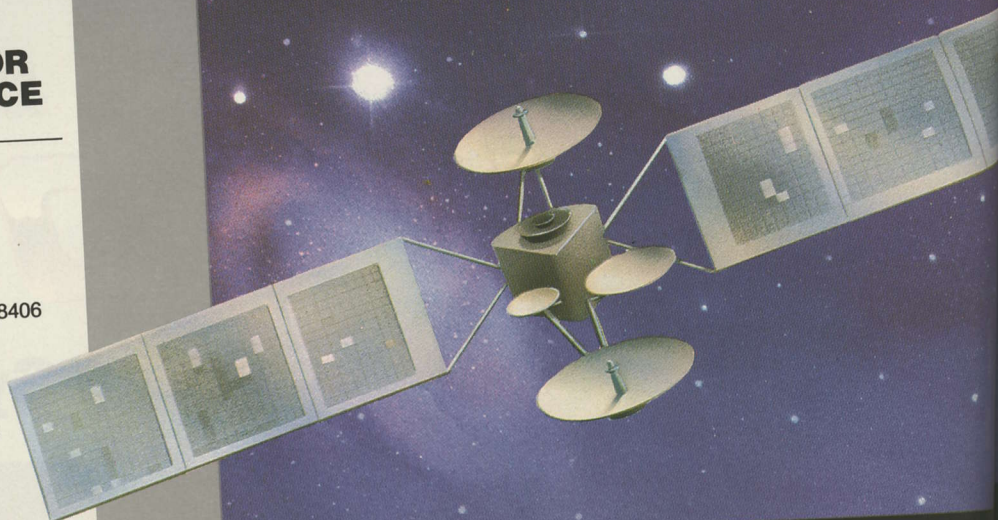
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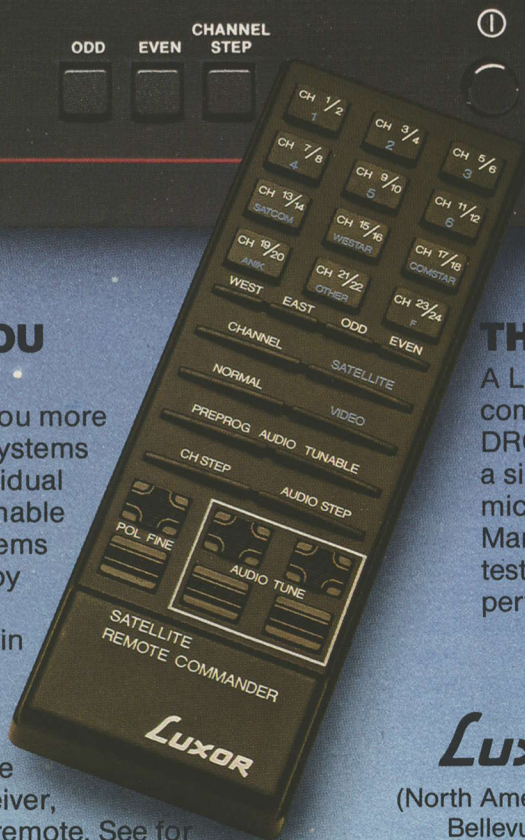
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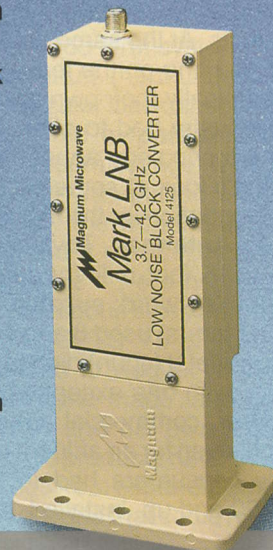
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## LEGAL TVRO/ continued from page 56

ity. Cable television grew during the 50's and 60's, **without FCC intervention**, because it provided a public service AND because it posed no apparent threat to any other Commission licensee. Cable television **stopped growing** in the late 60's and early 70's when a class of Commission licensee, television broadcasters, felt threatened by the continued growth of cable. Given that 'threat,' the Commission acted and cable, when the smoke cleared, would be substantially re-directed.

Up to this point, whether that point is 1979 or 1984, the growth of private, home, TVROs has not been a threat to any Commission licensee. At most, it had been a nuisance to premium cable programmers such as HBO and such firms (while they may hold various FCC licenses) are not 'regulated' by the Federal Com-

munications Commission. And so we enter the second-half of TVRO's first decade with no greater legal **certainty** than we had when it all began on October 18, 1979.

\* / In March of 1984, Senator Goldwater introduced into the U.S. Senate S.2437, a bill designed to clarify in a 'positive way' the 'legal viewing rights' of owners of home (private) TVROs. This legislation, pending as this is written, would make it very clear that ownership and use of a TVRO does not violate Section 605 of the Communications Act of 1934 (and prior). Also in March of 1984, Congressmen Gore, Tauzin and Rose introduced into the U.S. House of Representatives HR.5176, a bill which complements the Goldwater legislation. HR.5176 adds that in the event that any program suppliers using satellite for program distribution do elect to 'scramble' their transmissions, such programmers would be obligated to offer and make available (at fair pricing) their program services to private, home, TVROs. This legislation is also pending as this is written.

## TECHNICAL TVROs/

### SEPARATING Commercial From . . .

There was a period between early 1979 and early 1980 when it was difficult, perhaps impossible, to find a transition from 'home brew' private terminal systems to 'low-grade commercial' consumer systems. We'll look at the first 'consumer marketing' in the next chapter.

There were a handful of 'technical gurus' in the transition period; they often assisted a number of would-be equipment suppliers in their quest to produce useful products. At the same time, these technical gurus were also working on the leading edge of a new technology and typically their own systems would reflect the latest our industry had to offer; often months in front of that same technology appearing in products.

Let's look at some of that work and how it became the foundation for the first line of 'consumer' equipment.

- 1) **Antennas.** Taylor Howard's first system used a 15 foot military surplus screen mesh antenna. Key word; **surplus**. Robert Coleman's first system(s) used 8 and 10 foot Bell telephone surplus metal (spun) dishes. Key word; **surplus**. Others, with one exception were in the same 'fix.'

New, commercial antennas were priced far out of reach; even for an affluent consumer marketplace (most early consumers had to be affluent; terminals were \$9,000 and up, installed, in those days!). A \$4,000 ten

## THE STORY OF EARLY CONSUMER PACKAGES

foot reflector from Prodelin or Anixter-Mark (**plus mount and feed**) was hardly cost-effective. Two people tackled that problem and one commercial company tried to get pricing down.

**Oliver Swan**, a reclusive Arizona electronics whiz with highly specialized talents, had begun to build a new type of antenna in his desert location in 1978. He called it a '**spherical**.' The spherical was big, and ugly. That was the bad news. The good news was that it was 'cheap'; at least by 1979 standards. Swan's sphericals had several things going for them, in addition to 'cheap':

- 1) Because of the geometry of a spherical, you could stack two or more feeds in front of the dish, each at different (precise) locations, and receive two or more different satellites without moving the dish or reflector, proper. The screen spherical could be 'fixed' in a single location and the feed either moved (it sat on a 'tripod mount' out in front of the dish) or multiple feeds used. If multiple feeds were used, separate LNAs (one for each feed) and separate feedlines were installed and the user 'switched satellites' by switching feedlines.
- 2) The spherical was nearly flat, and it had no usual 'curves' which caused a builder big construction-accuracy problems. This greatly re-

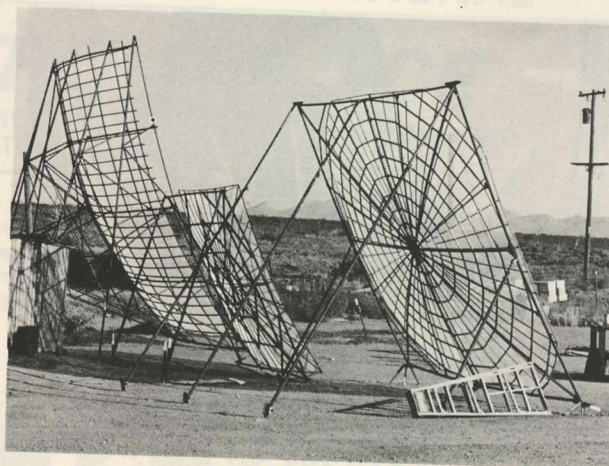
SWAN SPH  
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duced the 'tooling costs' for the antenna, and in fact thousands of people would 'build thier own' spherical in 1979 and 1980; a product of 'cheap' plus 'tolerance-forgiving.'

The Swan designed sphericals were very popular through the end of 1980. They never really died, but they lost favor when motor drives for parabolic antennas came along and people found it far easier to move a parabolic dish (to change satellites) than it was to move the sometimes cumbersome spherical tripod mounted feed. **Vidiark Electronics** and **Hayden McCullough** in Arkansas popularized the '8-Ball' version of the spherical and perhaps the most important thing that can be said about the '8-Ball Spherical' is that it introduced thousands of people to home TVRO service for a minimum of dollars.

Oliver Swan died just ahead of Christmas in December of 1979. As fellow Pioneer **Jim Vines** recently penned, "**Oliver's work on earth was done but the legacy he left behind would live forever . . .**". Swan had pioneered deep fringe (weak signal) terrestrial television antennas in the early 50's, low cost cable systems in the 60's, low-cost and low power TV transmitters in



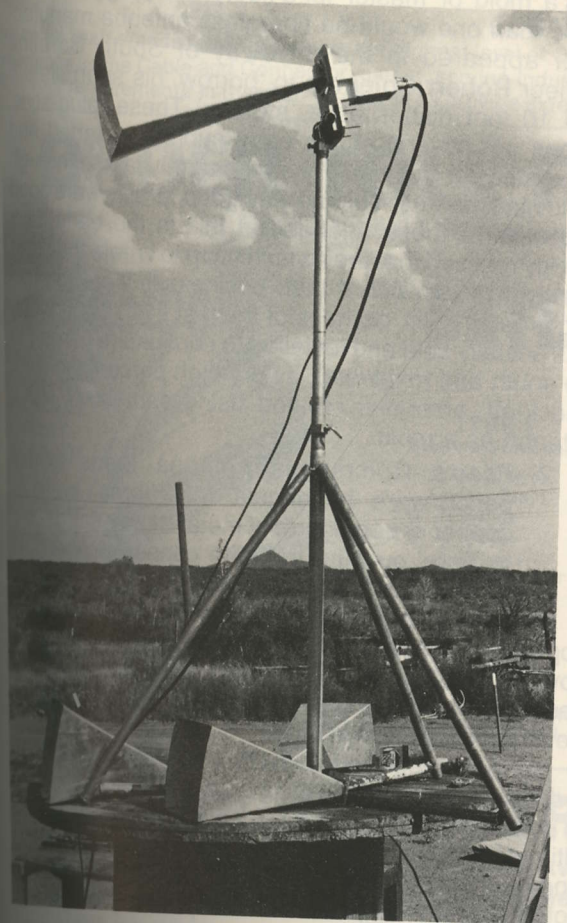
**OLIVER SWAN** Spherical antenna 'test farm' in Bisbee; he built them up to 20 feet in width and never lost his enthusiasm inspite of being exceedingly ill in his waning months.

the early 70's and he was headed towards being a substantial and creative force in TVRO when he died a premature death.

Spherical antennas, inspite of claims to the contrary, did not have great 'consumer appeal' however and perhaps, ultimately, that would be the reason they failed to grab a segment of the final marketplace. A parabolic dish, whatever its configuration, still seemed like the best approach. But tooling for a parabolic dish was an expensive proposition, and with limited exception, none of the firms that were already 'tooled' for dishes in the 10-12 foot size region wanted anything to do with this new, upstart marketplace. Oh, they would sell their \$4,000-\$6,000 dishes alright; but they quoted typical 'microwave mentality' delivery schedules of months and showed no interest in helping the new entrepreneurs selling these terminals learn how to use them. It remained for those who had unusual ideas about tooling to break the market.

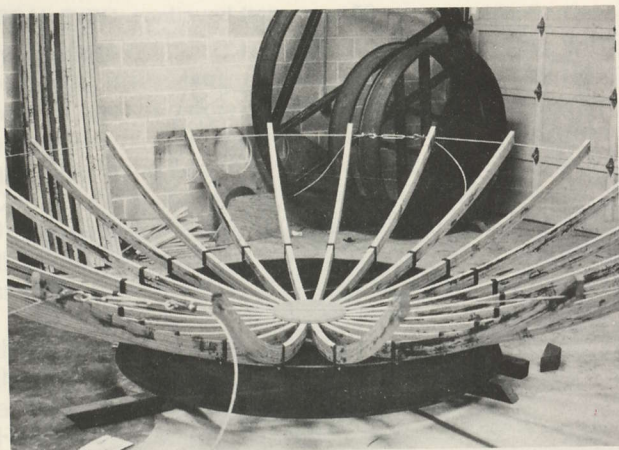
**Jim Vines** of Illinois was such a pioneer. His **Parafame** TVRO antenna line had (and retains today) a very unusual approach to parabolic curve integrity. Vines had designed a laminated wood strut system; he would hand-laminate the wooden struts (hard Oak) and mount them to a large, heavy, circular backplate/ring. The wooden struts were forced into a '**parabola of evolution**' by ringing the full circumference with a heavy steel cable. The steel cable was placed under stress and since it would not 'give,' the wooden struts did; they bent 'inwards' and formed a parabolic curve against which the aluminum 'skin panels' were installed.

Vines displayed his product (in various sizes from 12 feet to 15 feet initially) first at the SPTS '79 premiere home TVRO meeting in Oklahoma in August of that year. Each Vines antenna was 'hand made' and because his material cost was high and his own labor seldom included in the total cost, his products never had a high profit margin. This kept Vines from expanding into mass production, at a time when anyone that could have



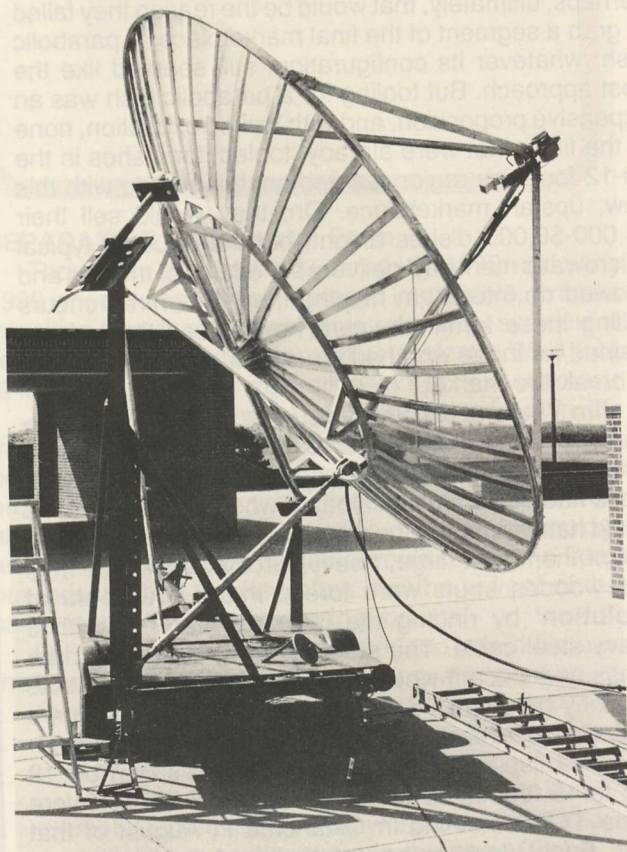
**SWAN SPHERICAL** feed horn was designed by Oliver's favorite method; 'Cut and Try.' His garage was filled with dozens of feeds that didn't try too good . . .





**VINES PARAFRAME** dish laminated Oak struts and stressed them with steel cable to obtain parabolic shape. Jim still does it the same way.

produced 25 antennas per month would have 'sewn up the market.' Vines, a craftsman but not a businessman, was not destined to become an antenna King Pin.



**USTC 13 foot screen-mesh dish.** Stormy Weathers displayed it and then took it off the market because he was not comfortable selling any antenna a tank could not run over without destroying the antenna.

Another early antenna technology that only briefly saw marketing was a 13 foot screen mesh antenna from the same **USTC** that provided the CATJ Lab with its initial 20 footer. USTC's **Stormy Weathers** had the wisdom to recognize a potentially large market for home antennas, but he also worried that his name be on any product which he was not comfortable with. Weathers, accustomed to building antennas that tanks could run over, and still have an operating antenna, was VERY uncomfortable with the wire mesh antenna his firm displayed in Oklahoma at SPTS '79. The product was a perfect example of 'the right product at the right time,' but 'marketed by the wrong person.' Priced at about half of what others of similar size cost, it **could have captured** the market from the very beginning. It did not because shortly after SPTS, Weathers withdrew it from his product line and substituted a more expensive, and more difficult to transport and assemble aluminum skinned version.

The early antennas available, and that sold, were largely the product of people who were into knocking-off molds in fiberglass. At the time, there was only a slight stigma attached to a firm that specialized in taking someone's high quality, expensive, solid dish and using it as a 'mold' or 'master' for a fiberglass 'plug' and copy. More than one would-be fiberglass antenna manufacturer appeared in the driveway of South Carolina pioneer **Robert Coleman** to 'borrow' his spun steel 8 and 10 foot dishes as a 'master.' These 'plug-style' dishes got several of the early suppliers started and fortunately for the industry, this era only lasted through six to nine months. Volume was good, profits were good and most of those engaged in this in the early days quickly realized that they would have to create their own 'molds' from scratch if their businesses were to grow and prosper. Still, perhaps of the first 200 or 300 terminals actually sold and installed to consumers (largely in the south and mid-west), a very high percentage were 'knock-off' antennas created using somebody else's antenna as a mold.

- 2) **Feeds.** Commercial antenna 'feeds' in this period were 'rectangular feed horns'; brass or copper or some form of metallic material shaped to 'flare' outward from the connector plate that attached to the LNA.

Early home system feeds adopted the same approach; only cheaper. The commercial versions were upwards of \$200, which when you carefully studied the geometry and materials, was about a 6,000% mark-up. Several people noticed this!

Not a few decided to build their own (a dollar saved is a dollar earned) and in short order feed prices dropped to under \$50 and then \$25. Price, however, was not the ultimate 'tool' here; performance was. A number of the engineering leaders, **Taylor Howard** in particular, noted that while the horn was a perfectly acceptable antenna, there was more to 'extracting' the dish captured satellite energy than opening up a 'funnel' and allowing the energy to 'pour in.' It would be mid-1980

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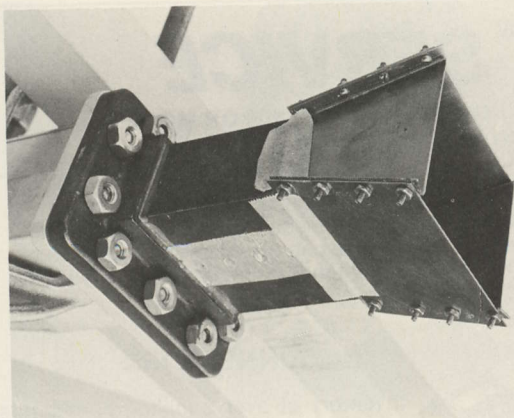
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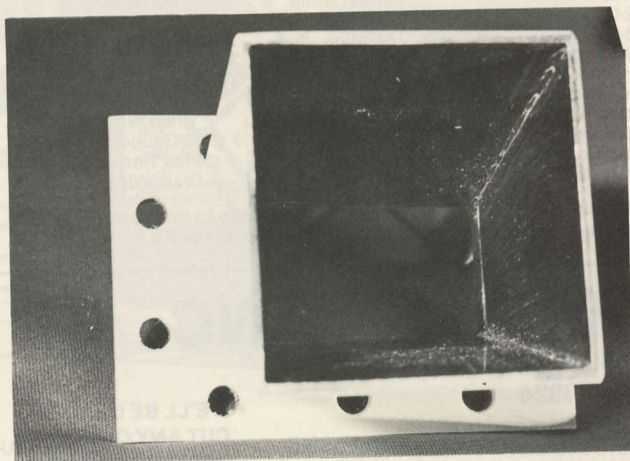
**DO IT YOURSELF** feed horn constructed from copper board, screws and a generous helping of 'tape'!

before Taylor demonstrated a 'better mousetrap' but once he did, there would be no looking back. For the first year or so of the young industry, a feed was simply a horn shaped antenna and everyone tried to do it cheaper. Better was out of the question.

- 3) **LNAs.** In spite of tremendous talents in the handful of engineering leaders in the new industry, LNA design and construction seemed out of the question. Some tried, and some succeeded on a very limited scale; but that was not where the early technologists would make their major contributions.

The first CATV terminals, the large ten meter sized S/A systems, used an LNA called a '**Bi-Polar.**' That meant the LNA was constructed using tiny transistors which were actually designed to function at a far lower frequency. As you increased the operating or use frequency (higher and higher into the microwave region), these 'testy' little 'bi-polar transistors' became unpredictable. No two worked alike, many did not work at all. That was in 1975.

By 1978 and 1979, bi-polar transistors had gotten much better, and much cheaper. They had one con-



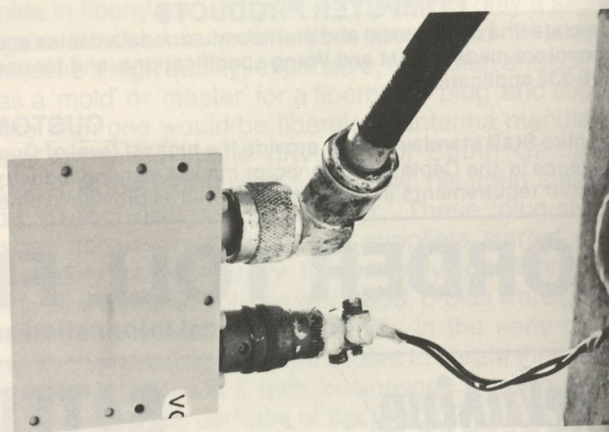
**COMMERCIAL STYLE** 'feed horn' from the backyard plant of Tony Bickel; pricing was in the \$35 region in early 1980.

siderable advantage, in addition to being cheap; they could be worked with on kitchen tables with modest hand tools and test equipment. Taylor Howard and others built their first LNAs using these microscopic transistors and had reasonably good results. But there was something better.

Shortly after the first S/A ten meter terminals came 'on line,' a new type of transistor called a '**GaAs-FET**' (which is short-hand for Gallium Arsenide Field Effect Transistor!) was introduced and it had great promise for LNA manufacturers.

The secret to a good LNA is something called 'low noise figure'; the lower the noise 'temperature,' the more sensitive the LNA. You want good sensitivity because that translates to better pictures. The best, the very best, LNA 'noise temperature' one might achieve with a **bi-polar** transistor was in the 300 degree (Kelvin) region. Degrees Kelvin measures how sensitive the LNA is and modern numbers are in the 75 region.

The first GaAs-FET LNAs were in the 250 region and



**EARLY LNAs** had two 'plugs'; one for signal and one for operating power.

they held the promise that this would go lower (as it surely did). There is a direct relationship between the LNA noise temperature and the size of dish required; a low noise LNA will produce sharp pictures with a small(er) dish; a high noise LNA will require a big(ger) dish to produce the same quality of picture.

For the home market, low noise was exceedingly important because the dish sizes were always limited in a 'yard-installation' situation. At least one early pioneer built his own GaAs-FET LNA units; Robert Coleman of Travelers Rest, SC. Coleman's contribution was largely that he removed the 'fear' that others had of GaAs-FETs and once he had shown that it could be done without expensive laboratory equipment, everyone buckled down to make something of this new technology.

Still, successful mass production of LNAs required tremendous skills, huge capital investment dollars and no small amount of expertise. It would remain a 'game' for those with the required resources. **Dexcel** (now a division of **Gould**) made a significant contribution to the

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# DOES THEIR PRICE INCLUDE...

## **LOWEST COMPETITIVE PRICES**

Satellite Sales Inc., shops the major distributors weekly, in order to keep our pricing competitive with the market place. Why waste your time . . . when you buy from Satellite Sales Inc. you always know you are getting the best possible pricing available, and all the other services we offer to boot.

## **QUALITY TVRO PRODUCTS**

Satellite Sales Inc., only sells products that have proven test data, or which have passed our stringent quality control department. For the most part, you will recognize the brands handled by us as leaders in the TVRO field.

## **FACTORY AUTHORIZED DISTRIBUTOR**

Satellite Sales Inc. only sells products which we purchase directly from the factory. No middleman add-on's and you always have the latest information and equipment.

## **QUALIFIED SALES PERSONNEL**

Each salesman has worked with TVRO equipment in the field as an

installer before ever making it to a sales desk. He knows your problems and can talk to you on your level. No salesman hipe, our personnel are on salary, not commission.

## **CONVENIENT LOCATIONS**

Satellite Sales Inc. presently operates two complete office warehouse locations. Each facility is full service, for speedy pick-up and delivery. We also maintain a West Coast antenna warehouse for our name brand antenna products.

## **QUICK DELIVERY**

Satellite Sales Inc. is completely computerized. All orders are processed the same day they arrive. That means next day delivery service in our main trading area, by regular UPS service and anywhere in the U.S. by UPS next day air.

## **FULL TIME WARRANTY SERVICE CENTER**

Unlike some distributors, where price is their only advantage, Satellite Sales Inc. maintains the largest warranty service center in the industry. Not only do we service what we sell, both in and out of warranty, we offer flat rate out-of-warranty service. With a large parts

inventory, and a computerized service authorization system, you are assured of the fastest possible service return.

## **DEALER SUPPORT**

Satellite Sales Inc. provides a complete dealer support service package available to any customer. Included are advertising slicks, consumer handbooks, product catalogs and manufacturer's literature. Also available on a limited basis is our mobile showroom.

## **WHOLESALE SALES ONLY**

Satellite Sales Inc. sells only to dealers, all retail sales are referred to our dealer network. We also do not own any interest in direct to the public type organizations.

## **TOLL FREE ACCESS**

We have convenient local area and national watts lines at each of our locations.

**CLEVELAND**  
Ohio Watts 800-321-1245  
Nat. Watts 800-321-1188

**COLUMBUS**  
Ohio Watts 800-521-6136  
Nat. Watts 800-345-5527

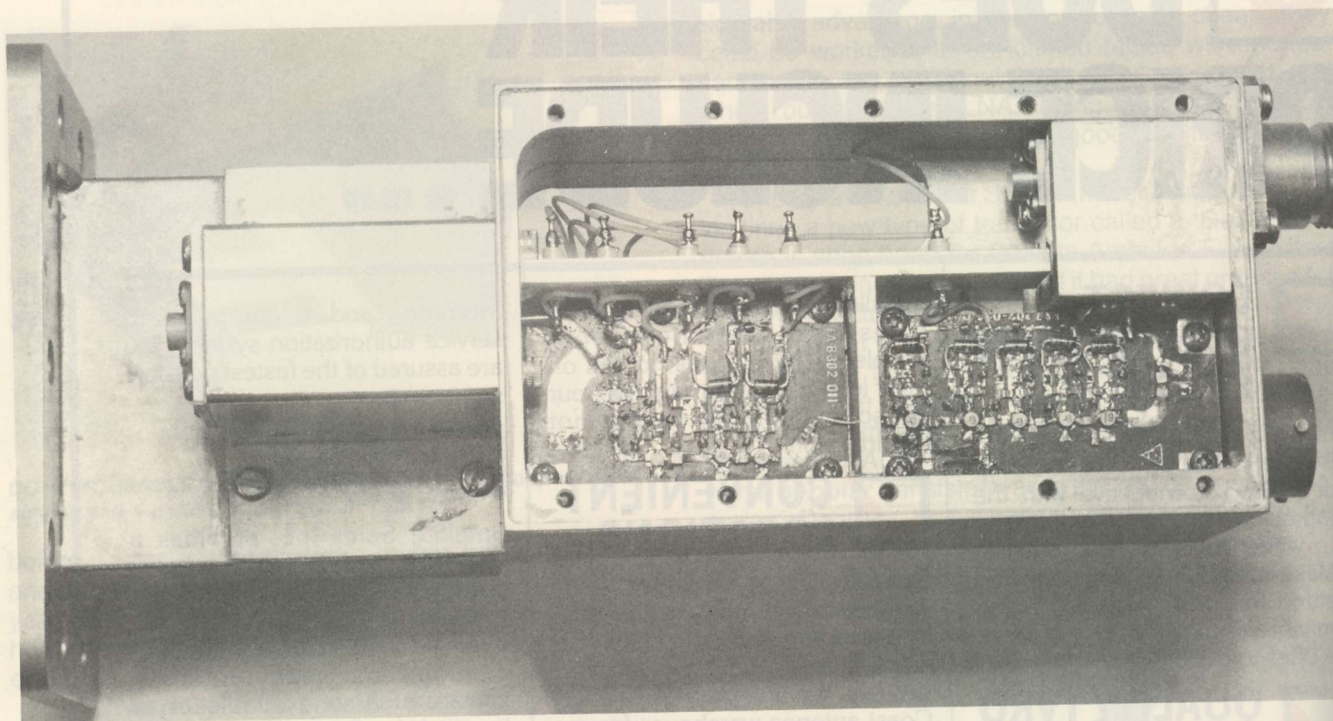
## **OURS DOES!...**

6955 Worthington-Galena Rd., Worthington, Ohio 43085 •

688 D Alpha Park, Cleveland, Ohio 44143 •







**GUTS OF VINTAGE LNA/** 'input' is flange at left, next bump to right is 'isolator' that tunes LNA to antenna. Mid-section are GaAs-FET amplifier stages while larger board to far right is 'bulk-gain' stage. Output connector top-right, power plug lower-right (courtesy of SCI, Inc., now Gardiner Communications).

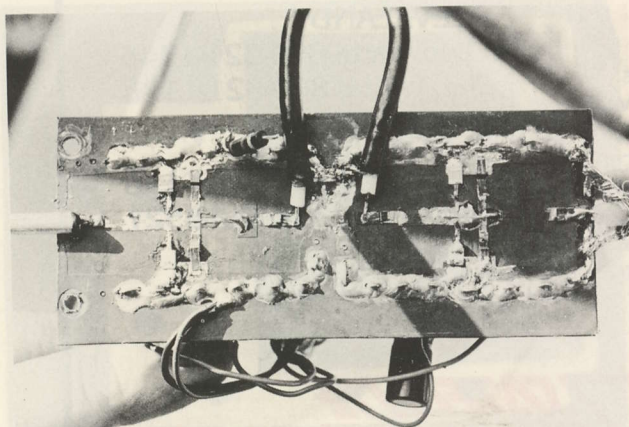
new home terminal market when their **Art Kawai** and **Yozo Satoda** recognized the 'potential' of the home TVRO industry and dedicated some of their corporate resources to creating LNAs specifically for this industry. They appeared at the first SPTS event in mid-1979 with an LNA which could not be sold to the CATV and other commercial users because it was patterned after the concepts of home TVRO. That particular model never did well in the marketplace, but it did serve to focus the attention of the professional LNA manufacturing crowd on home terminals. If Dexcel 'saw something here,' the reasoning went, 'perhaps they too (i.e. Dexcel competitors) might also find an interesting market here.' That

attitude, totally the product of early Dexcel dedication to a new industry, led to the early involvement of **Avantek**; a major supplier to the worldwide LNA industry. And that, in turn, brought others in and ultimately it would be the rapid growth of home TVRO that would change for all time the LNA marketplace worldwide.

- 4) **Receivers.** If the early pioneers could not make more than a 'psychological dent' in the LNA structure, their influence on TVRO receivers was quite the opposite. In receivers, perhaps more than in any other area of home terminals, we changed the world's concept of what microwave video technology was all about.

The first SPTS in Oklahoma in 1979 gave the budding TVRO user or seller four options:

- A) He could **build** his own terminal. Designs from Taylor Howard and Robert Coleman had been published; ultimately, within months, they would combine into a 'Howard/Coleman' receiver. For around \$1,000 and perhaps 50 hours time, you could build your own.
- B) He could **buy** a receiver from one of the two 'new' suppliers on the scene; **AVCOM of Virginia**, or, **International Crystal Manufacturing, Inc.** The AVCOM models were similar in design to Microdyne, but they had been 'stripped' by designer **Andy Hatfield** of many of the complicated Microdyne circuits and in true-to-be TVRO fashion, simplified greatly from the overly complex commercial unit. The 'ICM' receiver was very similar to the Taylor Howard

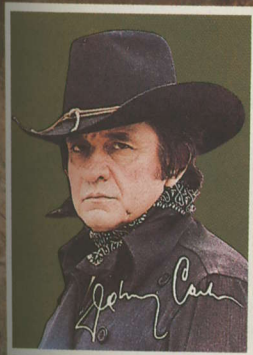


**EARLY GaAs-FET LNA** from Robert Coleman. His designs were never duplicated commercially but his 'never say no' attitude was an inspiration to an entire new generation of entrepreneurs.



**"Move over Henry,  
here we come!"**

**80¢**



## **Fantastic Family Entertainment for as little as 80¢ a day!**

Henry Ford put a car in every garage. Now International Video Communications puts a dish in every yard...

A revolutionary new sales and buyers initiative makes satellite TV affordable to every family. FutureVision Home Entertainment

**A World Leader in Satellite TV...  
a world ahead of the competition.**

Systems, an idea that will increase your sales and profits.

Don't miss the greatest sales initiative of the decade. Quality products, 100% financing and a company you can trust. Call today!



**International Video Communications Corp.**  
4005 Landski Drive  
North Little Rock, Arkansas 72118  
(501) 771-2800 1-800-643-5427

R.L. DRAKE ■ DX ■ PRODELIN ■ HOUSTON TRACKER ■ PANASONIC ■ PICO  
JVC ■ MTI ■ CALIFORNIA AMPLIFIER ■ KLM ■ SAT-PAK ■ TWEAKER ■ ASTRON  
KLOSS ■ LUXOR ■ CHAPARRAL ■ ODOM ■ PHENIX ■ PARACLIPSE

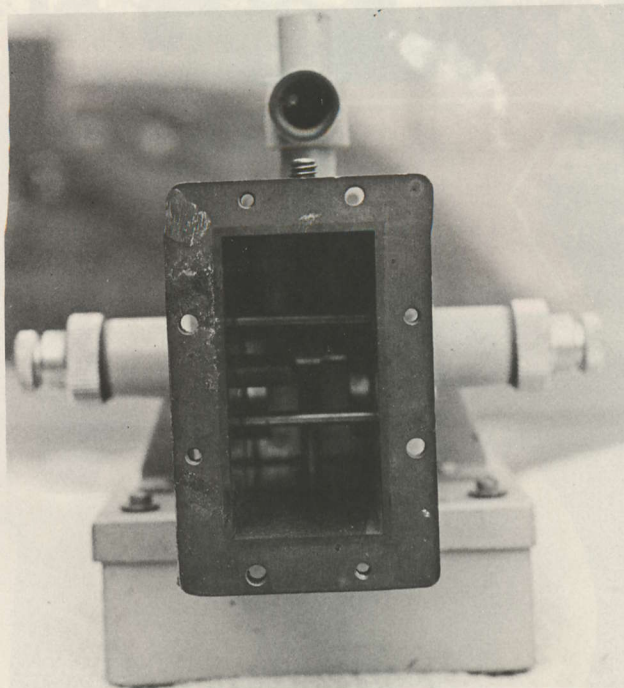


'do-it-yourself' model, and ICM had purchased the consulting services of one **H. Paul Shuch**, a California microwave engineer who 'starred' at the first SPTS with a marathon 12 hour seminar mini-series of his own.

- C) He could **purchase**, directly from H. Paul Shuch, a '**kit**' receiver and then go home and finish the *assembly on his own*.
- D) He could go back into the '**commercial market**' to firms such as **Gardiner Communications** or **Scientific-Atlanta** (both of whom were exhibiting at the first SPTS) and acquire \$4,000 price range receivers for home use.

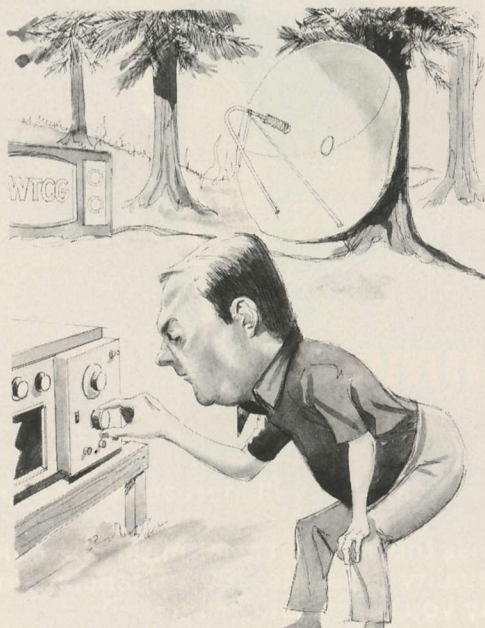
Of those four options, the Howard or Coleman 'build it yourself' approach was the least expensive and hundreds would do this. But they would usually only do it 'once'; for their own use. However, it would be at least two and perhaps three years later when the last vestiges of the Howard and Coleman circuits would disappear from the **commercial** home TVRO receivers; many segments of those early receivers stood the test of time and kept coming back as 'segments of' receivers which proudly proclaimed they were 'the newest' and 'latest' state-of-the-art in design.

**ICM** was the first to inaugurate true production line assembly although their production quantities remained small through the fall of 1979. **AVCOM** took longer to move from the SPTS demonstrated proto-type to the full production versions (AVCOM was new to the mass production world; ICM was an established company



**INFAMOUS TD-2 Bell Telephone microwave set; the mouth of the 4 GHz input receiver facing you. Unit single-converted 4 GHz region to 70 MHz standard (telephone company) IF and they were 'cheap' on the 'surplus' market; under \$25 IF you could find one!**

with decades of mass production experience). Original versions of either, today, are highly valued collector



**PIONEER ROBERT COLEMAN/** This individual pioneered the concepts of LNC, single conversion and integrated LNA plus downconverters in 1979 from his home/workshop in Travelers Rest, SC. Coleman today operates SPACEVISION LNAs.





# NEW FROM M/A-COM OMNI ROTOR



## THE BEST CHOICE IN MECHANICAL ROTORS

- The **only mechanical** rotor with an adjustable scalar ring for optimum system gain . . . on any size dish
- The **only mechanical** rotor with an in-line configuration for easier installation and optimum system gain
- the **only mechanical** rotor with a cast aluminum (not plastic) motor housing to protect the motor from contaminants and moisture

### The Omni Rotor also features:

- All aluminum scalar and housing for mechanical rigidity
- 0-180° rotation with fine adjustment
- Virtually zero insertion loss

Until today, installers who favored rotor-controlled feeds had only one choice. Trouble was, there was plenty of room for improvement. Now, here's the better alternative: M/A-COM's Omni Rotor.

Omni Rotor is the only mechanical rotor with an adjustable scalar ring, for optimum system gain. The only rotor with an all cast motor housing, to protect your motor from freezeup, contaminants and moisture. And it's the only mechanical rotor designed in-line, to make installation fast, easy and accurate.

Best of all, Omni Rotor is manufactured by M/A-COM Omni Spectra, the most respected name in the



Home TVRO industry. Other M/A-COM state-of-the-art Home TVRO products include the Omni Polarizer (with solid state control), 8' and 10' Prodelin reflectors, polar mount, receiver, LNA, LNB and cable accessories.

Take a look at the features of the Omni Rotor, and its price, and you'll agree: There's only one choice in mechanical rotors: Omni Rotor.

Check the adjoining strip for the authorized M/A-COM distributor in your area. Or contact:

M/A-COM Omni Spectra, Inc.  
21 Continental Blvd., Box C  
Merrimack, NH 03054  
(603) 424-4111



M/A-COM OMNI SPECTRA, INC.

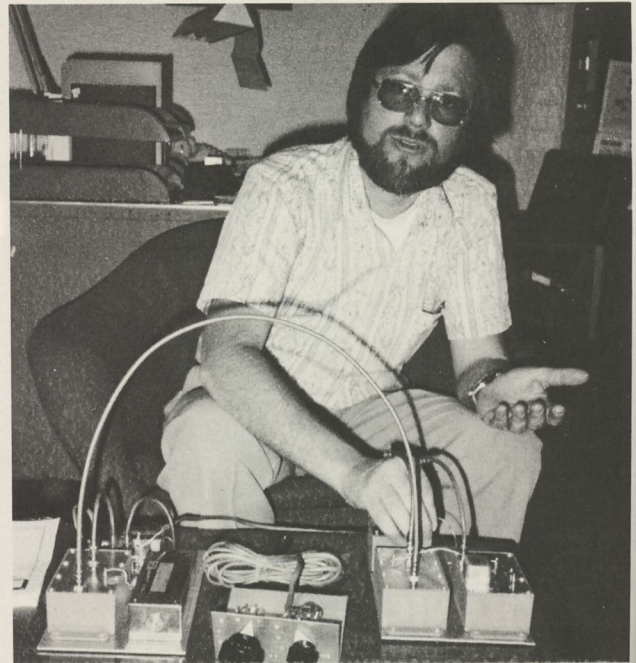


items.

**Pricing.** The early AVCOMs priced out just under \$3,000. The early ICMs were just under \$2,000. At the same time, the CATV receivers were \$4,000 and up; each. The combined production capability of AVCOM and ICM was not nearly enough to handle the modest interest of those who had become 'infected' with satellite-fever, however, and the majority of new systems sold to homes in that era ended up with the big-buck Microdyne or S/A or Gardiner receivers; simply because 'they were available.'

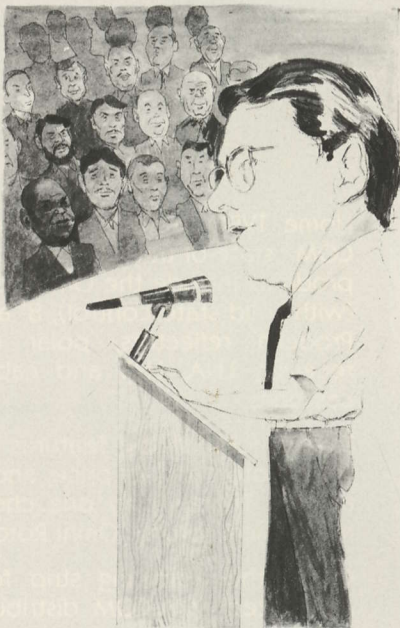
But the handwriting was evident; receiver pricing was going to head down and probably rapidly. H. Paul Shuch, writing in **CSD** in the fall of 1979, at a time when **only ICM** was shipping, boldly asserted that '**by summer of 1980** (barely 8 months away) **we will see TVRO receivers under \$1,000 . . .**'. Shuch would be proven correct.

Already waiting in the wings, as we shall see in our chapter dealing with the first real 'year' of this industry, were people like **John Ramsey** of Sat-Tec and **Clyde Washburn** who would make many meaningful contributions to those on-going from the likes of Howard and Coleman, and Shuch. We were a long ways from \$250 dealer-cost Far Eastern import receivers, but the clock was running!



H. PAUL SHUCH and his 'kitable' TVRO receiver. Shuch did all of the difficult microwave work and left the builder to complete the less critical work.

## TVRO & CSD/ OUR SIXTH YEAR!



**PIONEER TAYLOR HOWARD/** The first to package a home TVRO receiver for ease of duplication, creator of the Chaparral Super Feed, served as first President of the SPACE trade association and was leading spokesman for TVRO in the founding years. Howard today is a partner in Chaparral Communications.



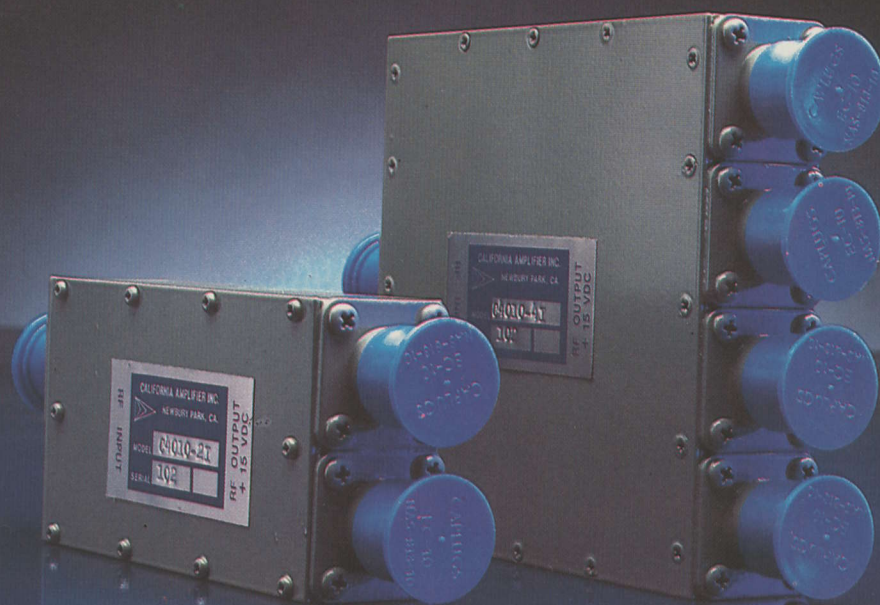
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California



# SIMPLE DIVISION.



California Amplifier's new Isolated Two and Four-Way Dividers make any multiple receiver system simple.

These new dividers split the signal, isolate the receivers, and block DC between all ports while passing DC power to the LNA.

California Amplifier's new

Isolated Two and Four-Way Dividers deliver a full 55 dB Isolation between each receiver.

Fully waterproof, these rugged new dividers are the most economical and practical Two and Four-Way power dividers available. Ask for California Amplifier and make a Simple Division.

## California Amplifier

California Amplifier Inc.

3481 Old Conejo Rd., Newbury Park, CA 91320

(805) 499-8535, TLX 469193



# "CONIFER IS THE TOP OF THE LINE OF OUR HOME SATELLITE TV SYSTEMS"

**During the Past Year 85% of Wes Hunter's Home Satellite TV Systems Sales Have Been Conifer Packages**

Wes Hunter, owner of Hunter's TV and Satellite, Inc., and Dave Cottrell, general manager, selected the Conifer Home Satellite TV System to replace the existing equipment they had been selling. Today, Conifer's DE-2001 System is their top-selling home satellite TV system.

## **WHAT DO YOU LIKE ABOUT CONIFER'S DISH?**

Cottrell: I liked the Conifer mesh antenna when I first saw it. I like the way the screen is attached to the petals...all you have to do is assemble the petals to each other. It's lightweight and aesthetically, it looks very good. It comes in several colors so you can blend the dish into any surrounding, plus, it has a low wind factor. The average installation of the antenna for two of our men is two hours, excluding concrete work.

## **HOW DO YOU MARKET THE CONIFER DISH IN YOUR AREA?**

Cottrell: Today there's a lot of confusion in the marketplace. Some people are selling low priced satellite systems with claims of crystal clear reception. The average consumer doesn't know what he's buying. We have a lower priced system on display and we show the consumer the quality of the pictures of that system compared to Conifer. Conifer shows the best picture. 85% of our customers buy the Conifer system!

## **WHAT DO YOU THINK OF CONIFER'S DEALER READY CONCEPT?**

Cottrell: It's unique. Everything comes to us in one package... the dish, feedhorn, 100k LNA cables, motor drive, receiver, it's all right there. The receiver incorporates the motor drive control and power supply. And, with the one piece cable, everything plugs together, you don't have to worry about connecting separate wires.

## **WHAT DO YOU THINK OF CONIFER'S RC-2001 RECEIVER?**

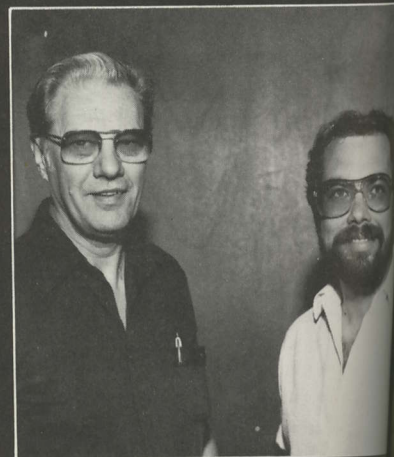
Cottrell: The most popular receiver feature is the satellite A or B switch which allows the consumer to push either button and select his favorite satellite. It's very popular among the buyers. The receiver is a good looking piece with everything built right in.

## **HOW DOES THE CONIFER DISH HOLD UP IN SEVERE WEATHER?**

Cottrell: Through this severe winter we had no breakdowns due to construction or workmanship of the system. We recently had some high winds come through our area and our Conifer systems stood up well. I really feel Conifer's antenna is a quality constructed piece.

## **WHAT ABOUT CONIFER'S SERVICE?**

Hunter: We really can't say enough about how well the people at Conifer treat us. They're a service oriented com-



WES HUNTER

DAVE COTTRELL

pany. They give us a two to five day turnaround in repair service. I've never dealt with a company that has given us such consideration. Their one year warranty policy is top notch.

## **WHY DO YOU RECOMMEND CONIFER?**

Hunter: They're reliable. We get literature from a lot of TVRO companies. You don't know if these people are working out of their garage or if they really are a legitimate TVRO company. We've seen a lot of TVRO companies come and go in the past five years. Conifer is in the business for the long run. We've seen their facility. We've seen their antenna manufacturing operation. As far as we're concerned Conifer is going to be around for a long time.

Contact Conifer today and ask for their new booklet: **77 Ways To Succeed in The Home Satellite TV Business.**

"Microwave  
AN1200 Micro  
Feed. Test p  
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antenna perfo

Microwave Sp  
admin

DE-2001  
THE COMPLETE  
USER FRIENDLY  
From CONIFER

- Total System
- Range Tested
- Micro-Grid "S"
- Choice of White
- 2-Hour Assembly
- Rugged High Strength
- Receiver Features
- Antenna Positioning
- Complete System
- Motorized Polarization
- Full 1-Year Warranty

\*Model AN1200C

BLACK





"Microwave Specialty Corporation has range tested the (Conifer) AN1200 Micro-Grid twelve foot aluminum reflector with a Polarotor I™ Feed. Test patterns indicate...side lobes of less than 18 db and 1.4° beamwidth will provide normal satellite receive signals. This normal antenna performance would be inclusive of operations at the eventual planned 2° satellite spacings.

Microwave Specialty is an independent test lab having no financial or administrative connection with Conifer Corporation."

Microwave Specialty Company  
Duane Tubbs, Chief Engineer

DE-2001  
THE COMPLETE DEALER READY-  
USER FRIENDLY SATELLITE SYSTEM  
From CONIFER

- Total System Concept Ensures Matched Performance
- Range Tested Gain: 42 dB  $\pm$  .5 dB at 3.95 GHz
- Micro-Grid "See-Through" Reflector Blends Into Any Environment
- Choice of White, Black, Tan and Forest Green Polymer Coating
- 2-Hour Assembly Time
- Rugged High Strength Aircraft Grade Aluminum Alloy Frame
- Receiver Features Include Channel and Audio Tuning, Built-in Antenna Positioner, Inverted Video, Scan Tune, and Polarotor I Control.
- Complete System Includes Antenna, Feedhorn, 100K LNA, Motorized Polar Mount, Receiver and Cables
- Full 1-Year Warranty

Model AN1200C Antenna Available Separately.



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GREEN

WHITE

Fill out this coupon or send your business card and receive Conifer's "77 Ways To Succeed In The Home Satellite TV Business"

Mail to: Conifer Corp., Box 1025D, Burlington, Iowa 52601

Name

Company

Business Address

City  State  Zip

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FOR QUICKER RESPONSE, CALL OUR TOLL FREE NUMBER 1-800-358-3058  
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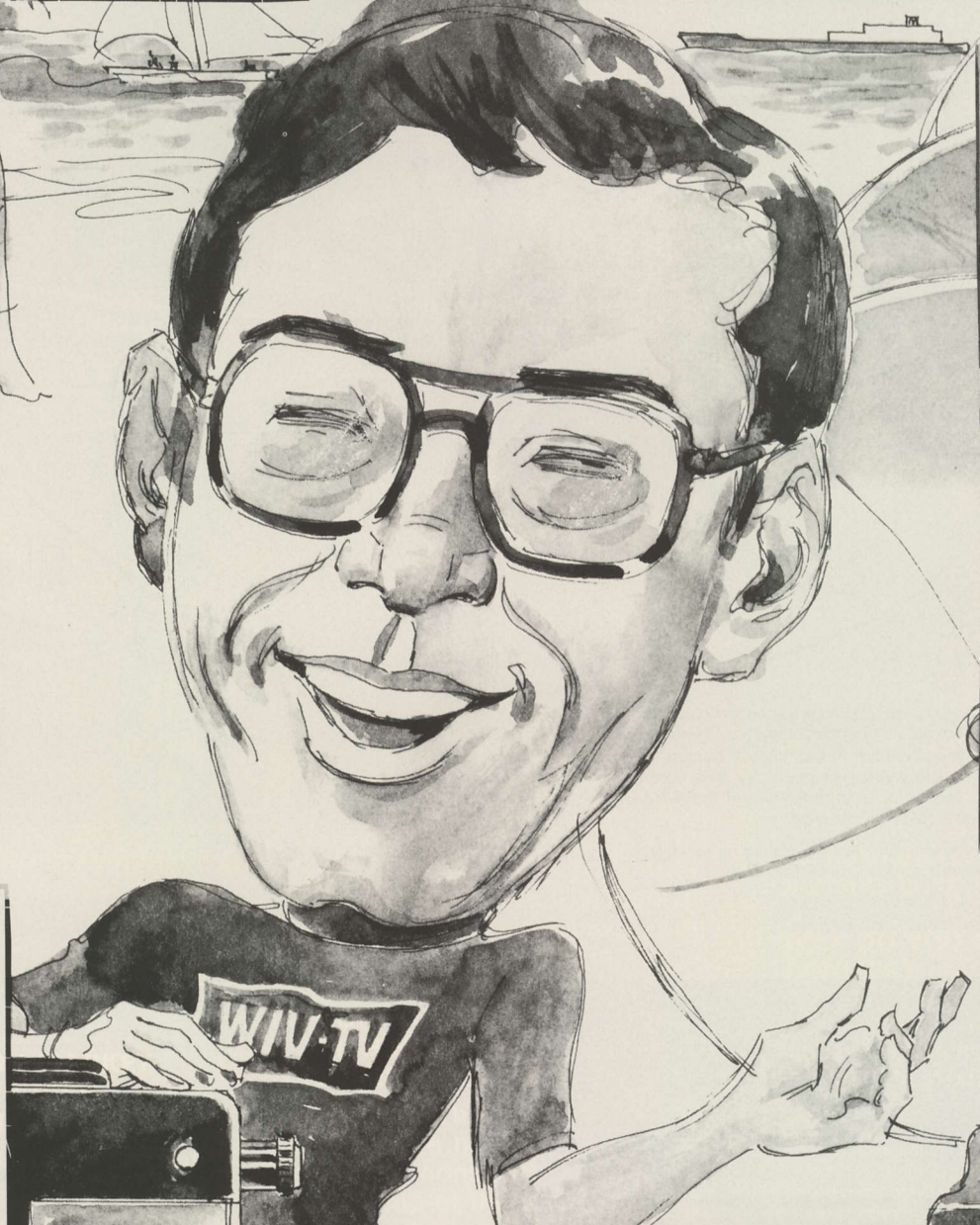
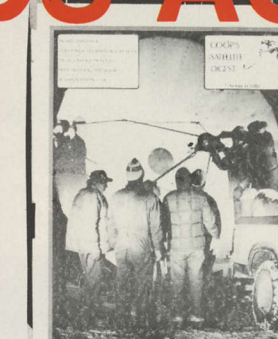
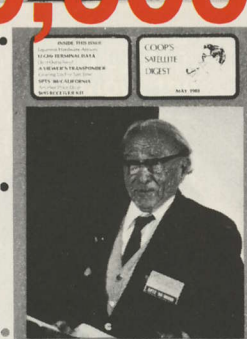
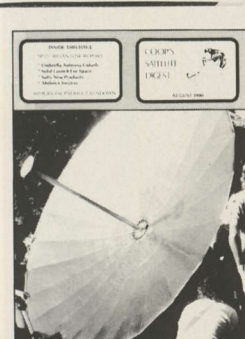
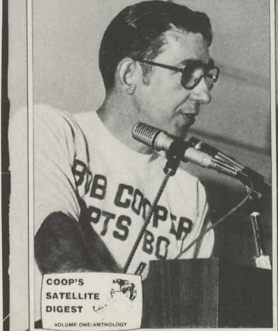
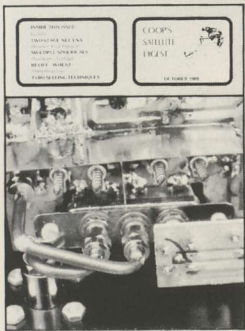
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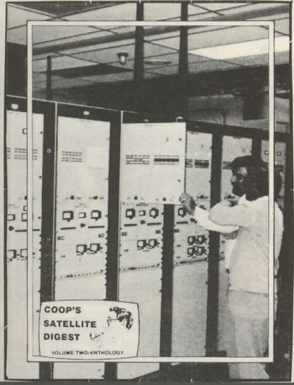
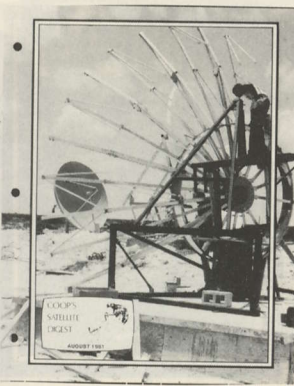
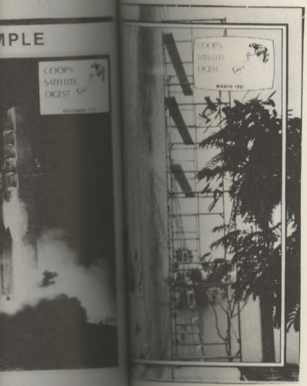
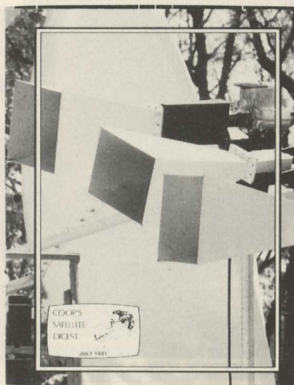
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7,500,000 WORDS AGO.







... give or take a few thousand, we did something quite innocent. We sat down and wrote a magazine article for **TV GUIDE Magazine**. It was published in the U.S. edition the week of 10/21/78 and in the Canadian edition the week of 11/04/78. Our life has not been the same since those two articles appeared in print, nor since the **Walter Cronkite** report visited our Oklahoma home shortly thereafter for what was to be the first of dozens of national and local TV 'interviews.'

The **TV GUIDE** articles described a new 'toy' I had built; a 'home satellite terminal.' Both articles were the same text although each editor chose to edit it in different ways.

The **U.S. edition**, for example, liked the idea that back in 1978 you could tune-in the 'uncensored version' of the Johnny Carson show with a TVRO. The Canadian editor was more excited about 'un-cut' premium movies; and both 'headlined' the article as they hoped it would draw the most attention.

**Both were correct;** within weeks I had received more than 10,000 pieces of mail! Sacks of mail were piled all over my tiny publishing office. All asked the same basic question: '**How Do I Get A TVRO???**' There was no answer; unless you 'rolled your own.'

So, between November of 1978 and August of 1979 I researched the field and located a tiny handful of talented people to help me 'create an industry.' They were **H. Taylor Howard**, a Stanford Professor, **Robert Coleman**, a South Carolina radio amateur, **Oliver Swan**, an Arizona electronics whiz and **H. Paul Shuch**, a California professional circuit designer. Together, with 'some help from our friends,' we built the foundation for the home TVRO industry. Coleman, Shuch, Swan and Howard brought their training and intuition to the 'party'; I tied it all together and wrote dozens of additional magazine articles and appeared on dozens of additional TV shows to get 'the word out.' By the fall of 1979, there were several (small) electronic firms offering TVRO receivers, antennas and LNAs to the struggling new industry.

**By the fall of 1981** we had an industry trade association, captained by able Washington attorney **Richard L. Brown** (we called ourselves 'SPACE!'), thrice-per-year trade shows attracting a thousand or more people, and we even faced bills introduced in Congress to **prevent us** from watching satellite TV. We were in the big time; or so we thought!

### Get the Johnny Carson show before it's blipped!

With a satellite dish, you can cut in everything from blips to a Rock! (CMAA copyright) by R.B. Cooper Jr.

If you live in a major metropolitan area, you may be able to pick up as many as five television stations. If you live in a rural or remote area, perhaps you get only one or two stations—or none at all.

I live on a farm, 20 miles outside of Oklahoma City. And, in my house, we have a choice of 26 different TV channels. We watch live action from Argentina, highlights from Mexico, and a "Greatest" in water on our TV.

Nothing grows older faster in America than yesterday's technology. Convenience as readily as something new. Now, if you find something new just happens to be something better, so much the better.

I am about to describe the latest technology in home television reception. It is not cable TV. Nor home videotape recording. It is not pay-per-view television. It is a satellite television system.

Use this—look at that! You'll see the communications world.

This is no science lesson, but bear with me for a few short sentences on satellite technology. There are today some 34 communication satellites in orbit, operating in a mode known as "geostationary orbit." This describes the satellite's position in space, some 22,300 miles directly above the equator, and its rate of forward speed. At that elevation and with just the right forward speed, the satellite appears to stand still to an observer on Earth.

That's important because it allows you to point a special antenna at the spot in space occupied by the satellite and then wait until the satellite is in position. It's not a special antenna, but a special antenna will do the job.

So, if you should want to tune in a special satellite, it will be pointing at the satellite. If you should want to tune in a special satellite, it will be pointing at the satellite. If you should want to tune in a special satellite, it will be pointing at the satellite.

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So, if you should want to tune in a special satellite, it will be pointing at the satellite. If you should want to tune in a special satellite, it will be pointing at the satellite. If you should want to tune in a special satellite, it will be pointing at the satellite.

### 10/21/78 EDITION of U.S. TV GUIDE

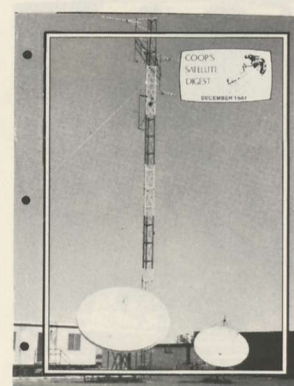
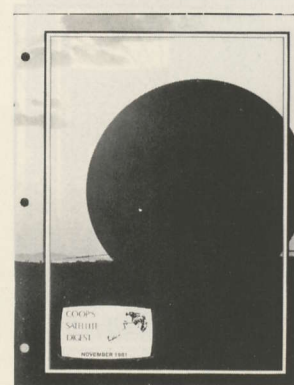
### PAY-TV WITHOUT PAYING?

Yes, all that and more—but first you have to build your own TV-satellite antenna

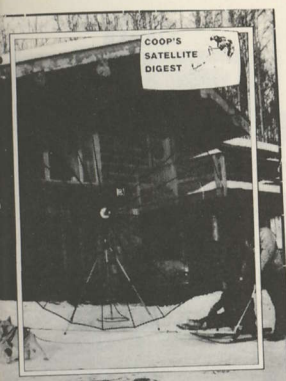
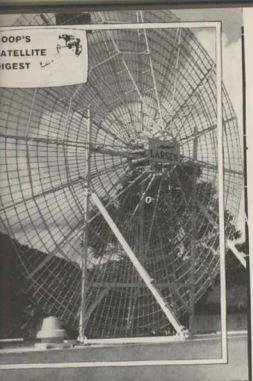
By R.B. Cooper Jr.



### 11/04/78 EDITION Canadian TV GUIDE







Well, the 'Big Time' is elusive and here we are in the fall of 1984 with more than 500,000 home TVROs installed and operating and perhaps as many as 50,000 new terminals being sold every month. NOW (we think), **THIS** is the Big Time! When in truth, the surface is barely dented; the industry is hardly walking yet. The future ahead counts millions and millions of home TVROs spread all over the globe.

In October of 1979 we 'launched' **CSD/Coop's Satellite Digest**. That was more than 75 'issues' ago (we are now TWICE per month!) and no less than 7,500,000 words have poured through our typewriters (and more recently, word processor) in the interim years. From its first appearance in October of 1979, CSD has been '**the trade bible**' of TVRO. We were not only first, we were, are now, and will continue to be the most authoritative industry publication (every two weeks) in TVRO. We do not take that position lightly.

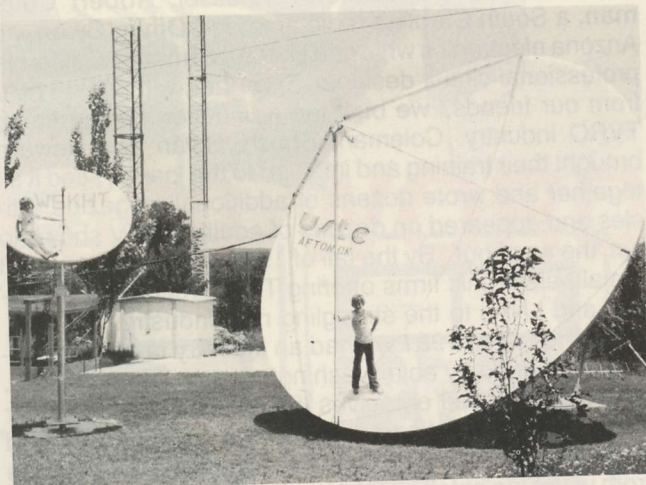
**Articles in CSD** have pioneered EVERY important technical advance in our industry to date. Articles in CSD have profiled every important new discovery in TVRO to date. And, articles in CSD have paved the way for our present TVRO 'Dealer' system.

**CSD is not a give-away publication. We don't mail it to just 'anybody.'** We mail only via AIRmail. Worldwide. Every two-weeks, or twice per month (CSD on the 1st; CSD/2 on the 15th). We have an enviable record for being 'on-time' and a subscriber list made up of just about every REAL dealer in TVRO, distributor, and manufacturing firm in the **entire world**.

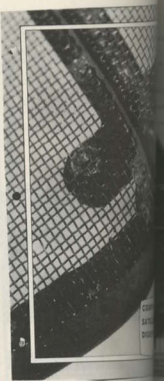
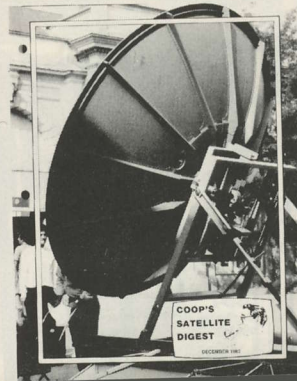
**CSD** costs \$75 per year for 24 issues; AIRmail to U.S. (zip code) addresses. In Canada and Mexico, \$85 (U.S. funds) and elsewhere \$100 (U.S. funds). CSD will save you more money, and time, each month than the entire year's subscription costs (**it's a fact**: it costs us more to print and 'post' your AIRmail copy than you pay in subscription fees; and that is just the actual printing and postage cost!).

**CSD is number one where it counts; with dealers and distributors and manufacturers who REALLY make this industry 'click.'** If you are serious about TVRO, you need CSD. **Because WE are serious about TVRO too.**

On the rear cover of this brochure you can order your own personal CSD subscription (note different offers for different locations), or, a 'sample copy' to study. Oh yes; the photo below was Coop's first systems; a 20' and a 6' back in 1977! **NOW, who says TVRO is NEW!**



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## CONSUMER TVROs/

## THE STORY OF WHO THE USERS WERE

### NOT Consumer Friendly . . .

Who was the 'consumer' of 1979? Perhaps there were none; perhaps the only consumers were electronic Tekno-Freaks who wanted a TVRO because it was the 'latest electronic toy.'

There were two 'approaches' to consumer marketing in 1979. Neither was terribly effective and as long as the equipment sources were running so far behind, neither made much of a 'dent' in the marketplace. Volume production, of any segment of a system, was still years away.

The most visible approach was practiced by Scientific-Atlanta. S-A entered the home satellite terminal market in April of 1979. That, clearly, places them ahead of all others. They coined the term '**Homesat**' and were farsighted enough to 'register' the term with the U.S. Trademark folks. Homesat, today, is to be printed Homesat®.

**Scientific-Atlanta** had several things going for them; price was not one of those things.

- 1) They were the largest manufacturer of commercial TVRO terminals.
- 2) They had established a close working relationship with the primary cable program suppliers, especially HBO.
- 3) They had a 'track record' and a network of installing dealers or distributors nationwide; the cable firms to whom they had sold terminals previously.
- 4) They had the corporate 'muscle' and finance to launch a full scale effort.

A man named **Richard Campbell** was chosen for the task. Campbell had impressive credentials, coming to S/A from the marketing arm of Bell Telephone. He was comfortable with every aspect of satellite terminals and saw the opportunity as 'unlimited.' He would later employ the talent of some major Atlanta based marketing people, including the advertising agency that handled the national Coca-Cola account, to put his image together.

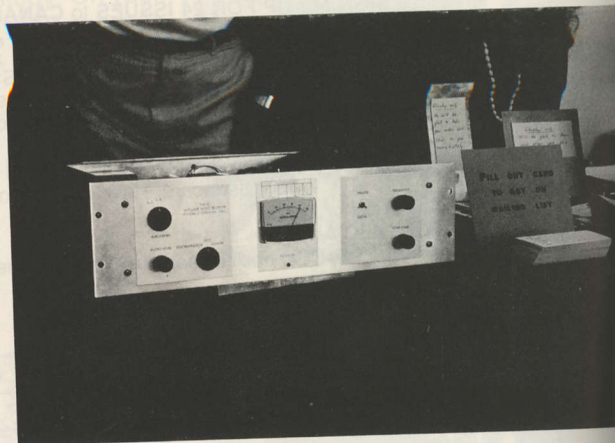
Campbell had two primary jobs;

**One/** he was responsible for creating a marketing and technical support program for Homesat terminals, and,

**Two/** he was given the task of working out the arrangements with the cable program suppliers and the cable industry.

It would be a failing of the latter which would ultimately doom the Homesat program.

Campbell was very aware that Bob Cooper had been working with **Microwave Associates** to 'create a home TVRO industry.' M/A first became interested in the possibilities of home TVRO in 1978. They put together an internal task force to study the market potential and an internal engineering task force to design equipment **specifically** for home TVRO. These task forces worked diligently during 1978 and into the start of the second quarter of 1979. M/A actually had working, proto-type, home receivers **by the start of 1979** and an elaborate marketing plan in place. Through an arrangement with Prodelin (which would later become part of the M/A-Com family) antennas for home systems would be produced. It was all very neat and the program would have been into the world at about the same time as the S/A Homesat plan had there not been an unexpected change in top M/A management at about the same time. The project, perhaps after a \$200,000



**AVCOM NUMBER ONE/** on display at SPTS '79 in Oklahoma City. Familiar shape, and style with paper-front panel and typed meter and knob 'call outs.' The Hatfields received sufficient orders for their PSR series receiver to put them into the TVRO business to stay!

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RICHARD CAMPBELL of Scientific Atlanta (left) explains some S/A 'Homesat'® literature to Coop on the Cable Satellite Magazine television program in late April of 1979. Homesat had everything going for it . . . and it failed. Many others would take warning from this failure.

investment, was shelved 'for the time being.' That left S/A as the only 'serious entrant.'

Campbell elected to announce the Homesat plan on Bob Cooper's 'CABLE SATELLITE MAGAZINE' television program. He traveled to Oklahoma and in mid-April they recorded the nearly 50 minute discussion during which Campbell explained to the cable-industry audience what Homesat was all about and how it would work.

S/A saw the cable operators as installing 'dealers' for Homesat terminals. He needed their help for two reasons:

- 1) He did not see sufficient dollar profit in each terminal to make it possible for an Atlanta based factory crew to run all over the western and central United States sticking in 4.5 or 5 meter terminals;
- 2) More importantly, he had the 'program permission' problem.

**Program permission.** S/A had started at the top at HBO to try to work out some arrangement whereby Homesat viewers could become 'legal users' of cable

programming sources. First they tried a simple 'affiliation contract' approach; each Homesat viewer would be signed-up by (say) HBO and treated as a cable firm. The fees would be \$120 per year (\$10 per month), paid annually, in advance. HBO didn't 'buy this' because, as they pointed out to Campbell, the 'record keeping and invoicing costs' exceeded the \$120 per year revenue.

Next Campbell tried to establish a separate operation and Homesat would be the 'cable company' and it would be invoiced by (say) HBO each month for the number of 'satellite-terminal-customers' it had on line that month. In effect, Homesat would be **a cable company without cable**. HBO didn't like that because they saw it as a potential 'end run' around local cable affiliates.

Next Campbell suggested that the satellite terminal customer would become **a non-interconnected customer for the nearest HBO affiliated cable system**; the Homesat user would pay the nearest cable company once per year, in advance, and the cable company would simply 'increase by one' the actual number of cable connected homes it had on line using HBO (for



each Homesat customer in their area). That idea had sufficient merit that it flew, briefly.

Campbell had to put together a selection of such program sources for the potential Homesat owners. S/A's engineering department wanted to see each Homesat terminal be a 'miniature, stand-alone' cable (or SMATV) system. That meant individual, single channel, NOT field tuneable receivers, dedicated at the factory to a specific satellite channel. The individual receivers would have an internal medium 'power' modulator so the two or four or whatever number of channels the Homesat buyer selected would be cabled, together, to as many TV sets as there were on premises.

**Campbell fought this approach**, sure that the Homesat viewers would want to make their own 'programming selections.' But he was against a brick wall; the S/A legal department would not clear his approach unless Campbell was able to obtain full, written permission from EVERY satellite programmer then on the air. Several, such as the network feeds and PBS, said flatly 'no.' That left Campbell where he had to agree to the single channel, dedicated receiver approach. And that may have proven to be a substantial problem **had** the marketing effort really gotten off the ground.

After the 'Cable Satellite Magazine' roll-out, Campbell went to work to locate some 'test installations.' He attended, with a non-operating mock-up system, a number of farm and home and cattleman association 'trade shows' in the southwest during May of 1979. He found several prospects and one, the owners of the **Bell Ranch** located northwest of **Tucumcari, New Mexico**, looked especially promising.

The Bell Ranch, all 360,000 acres, was so far from anything that the Lane family that operated it had never seen television. They had a young son who had never seen **Sesame Street** and Mrs. Lane was anxious that he be exposed to modern youth-oriented technology.

At the same time, Campbell had been working on a special promotion with Dallas department store **Nieman-Marcus**. Each year the Nieman-Marcus Christmas Catalog featured some 'outlandish, new' very expensive 'toy.' Campbell wanted their 1979 catalog to feature an S/A 'Homesat' terminal.

Between his plans for Nieman-Marcus and the real interest of the Bell Ranch, a deal was struck; if the Bell Ranch would allow some promotional efforts by S/A and Nieman-Marcus, a special price would be given to the Lanes. It was in early July of 1979 that the very first Homesat terminal was installed; a four-channel, dedicated receiver, TVRO system that carried a list price in the \$22,000 region. **The same terminal**, featured in the Nieman-Marcus catalog some five months hence would be priced in the **\$36,000** region. Nieman-Marcus, of course, had to 'take their own mark-up!'

By the first SPTS in mid-August, S/A's Campbell was able to report that four such terminals had been sold and were either installed or being installed. At \$22,000 a pop it was not big business but it was promising. Each of these early buyers would be using dedi-

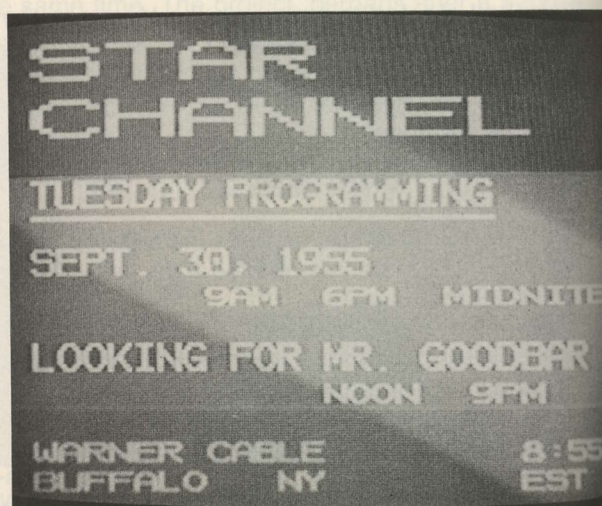
cated receivers and they were selecting on their own, in advance, how many channels they wanted and what those channels would be. A new problem had been brewing, however.

**Campbell was scheduled** to address the SPTS '79 crowd on two occasions. He did so once and in that talk outlined how his firm was anxious to be a part of an exciting; new industry. Before his second appearance, he was on an airplane to New York; HBO had beckoned, he said.

**Within a week of SPTS '79**, the entire Homesat program was in shambles. Something, never appropriately reported, occurred between the program suppliers and S/A. At this point S/A had to have in excess of \$500,000 invested in the project. The only way they were going to get that investment back was to sell a bunch of terminals. Nonetheless, within a few weeks they would 'walk away' from the entire project and place the 'Homesat®' name into a corporate law library to await another day. The program simply died because (as Campbell would later tersely comment) **"there were problems with the program suppliers which we could not overcome . . ."**

In all fairness, others had similar concepts. **Gardiner Communications** tried a similar program, bundling up individual cable oriented satellite programmers for re-sale to individual homes. They had no better luck, and in fact probably did even worse, than S/A. The plain truth was that someplace in New York there was a 'hill' built by the programmers which not even S/A muscle could climb.

The same SPTS '79 did see a pair of announcements concerning other premium program suppliers; **Al Parinello** of **Star Channel** (later The Movie Channel) addressed the audience and said his firm would accept checks for \$96 for a year of Star Channel service. A few such checks were written. Ed Taylor's man **Sel Kremer** explained why **Southern Satellite Systems** could NOT



**STAR CHANNEL/** accepted \$96 per year from home terminal viewers for a brief period of time in mid-79. Notice it was uplinked from Buffalo, New York; and no, this was not 1955!



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accept money from private terminal operators (SSS was only 'licensed' to serve cable systems) but then provided them with an 'out'; if the private home systems would **pretend** they were cable systems and pay the 'minimum fee' of \$60 per year for WTBS service (the equivalent of having 50 cable subscribers).

Later in the fall of 1979, **ESPN** would, in a confusing series of announcements, first offer home terminals 'Lifetime Viewing Rights' for a paltry \$1.40(!) and then weeks later up that to \$100. This was in a period when ESPN was 'free to cable operators.' Before 1979 was over, **no cable service** (including Star Channel and ESPN) would be accepting money from home terminals.

If the programming and marketing was 'confused,' the consumer's choice of equipment was more so. First of all, there were no real dealers, yet. It may be difficult to ascertain with accuracy who was the real first dealer in the industry, but certainly **H and R Satellite Communications of Pocahontas, Arkansas** had to be very close. John and Virgil left the Oklahoma SPTS with a pick-up truck loaded down with every piece of equipment they could purchase off the floor. Within weeks they would be building fiberglass satellite antennas.

They formed an early affiliation with **Microdyne** but Microdyne was, at best, 'nervous' about being associated, directly, with the home satellite terminal market (that old cable industry 'fear' again). Knock-off antennas were built, LNAs bought on the open market and receivers were located where they could be found. There was no 'standard package' of anything; no two systems were exactly alike. Cash sale prices for installed systems averaged in the \$10,000 region and there was a waiting line for anyone who could deliver. Antennas were fixed-mount (no motor drives), usually on F1. Ten and 12 foot antennas prevailed and TV antenna rotors switched polarization.

**Opportunity abounded;** equipment was in short supply, knowledge was hard to find, and once you had a terminal up and running, you faced the largest problem of all; knowing what was going to be transmitted when (there were no readily available program guides)! HBO and Showtime, prior to sign-on each day, would 'roll' several hours of schedule announcements on the screen so the viewer could determine what movies (or specials) would be telecast at which time. It was all sort of loosey-goosey but few complained; the excitement of it all was overwhelming!



**MONTAGE** of photos shows the Bell Ranch installation in New Mexico, done by Scientific-Atlanta in July of 1979. Four channels, dedicated receivers, and a place in the Nieman-Marcus catalog.



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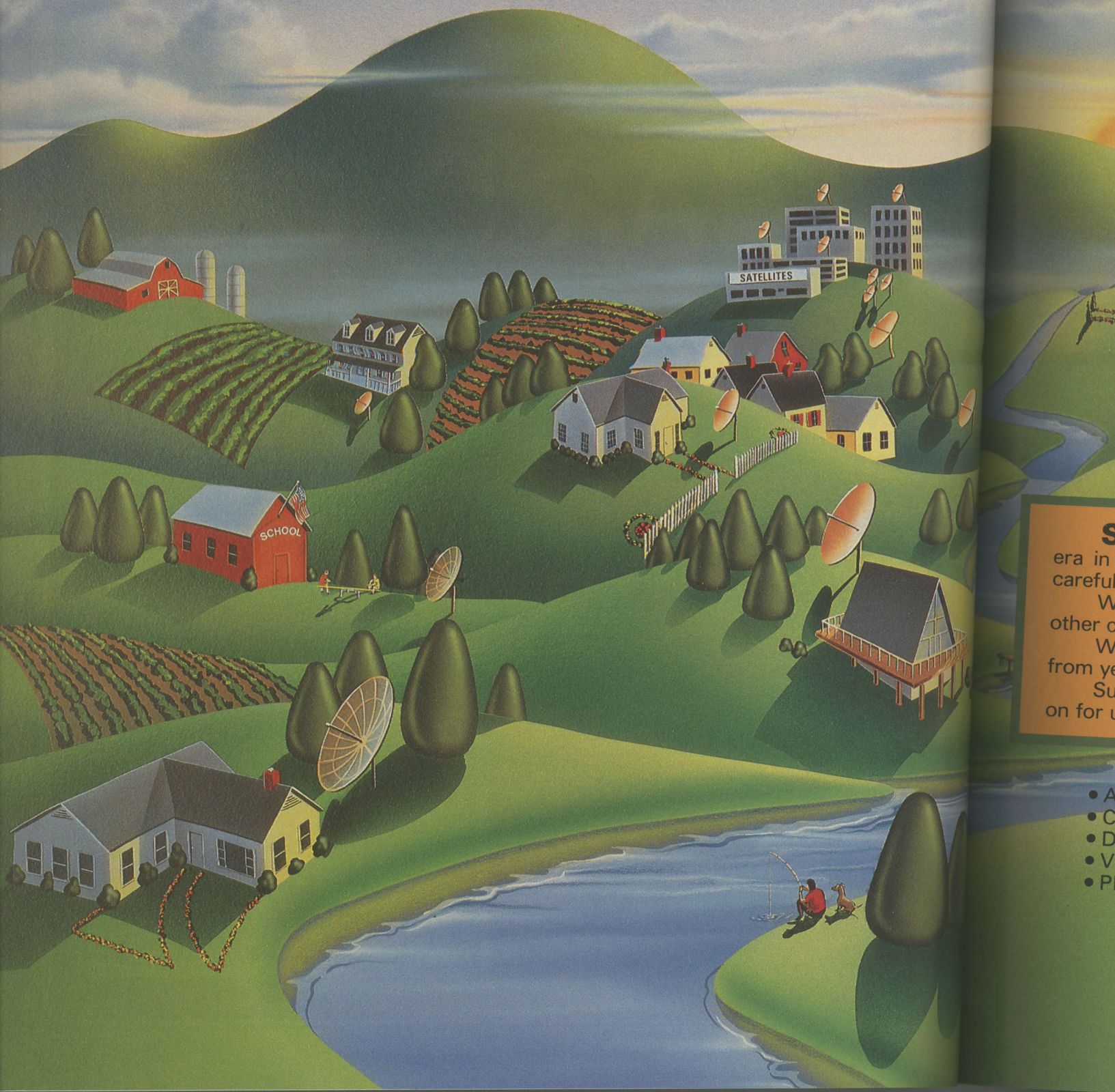
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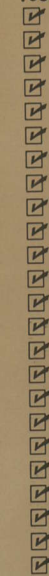
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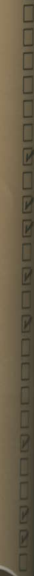
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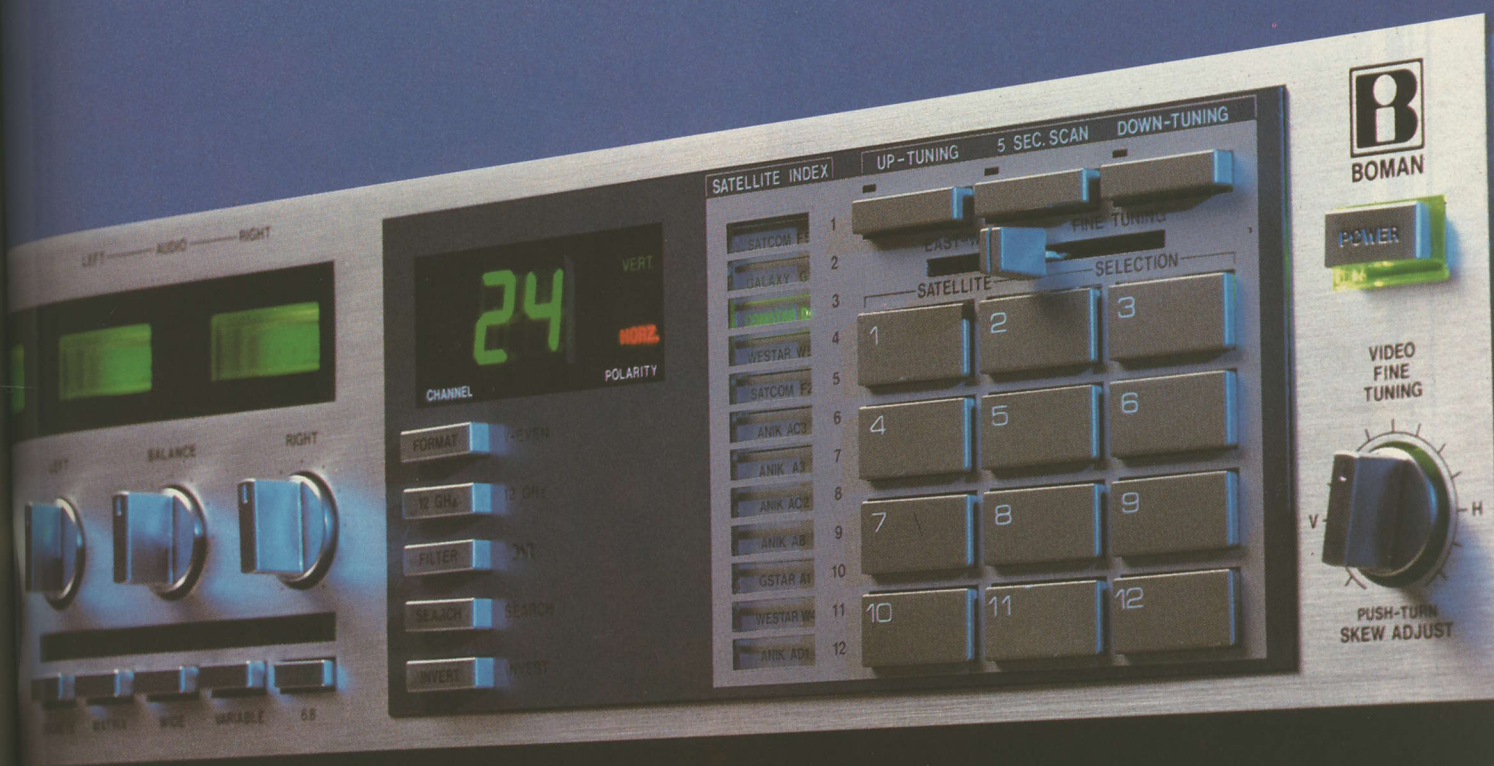
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## YEAR ONE/

## HOW THE INDUSTRY HANDLED THE FIRST 12 MONTHS

A shortage of equipment, a less than accurate grasp of the technology, and a question of priorities all characterize the first full year of TVRO; the period that began in October of 1979 and ended in September of 1980.

Those first 505 people, who attended the inaugural SPTS '79 held at South Oklahoma City Junior College in August of 1979, were the ambassadors of TVRO. It was at SPTS '79 that Coop announced **CSD** and offered a special subscription offer; those signing up would receive a ten percent discount for signing up at SPTS, and, each would be given a '**Pioneer Certificate**' which would entitle them to ongoing discounts for **CSD** and affiliated products through the years. Slightly more than 400 such 'Pioneer Certificates' were issued before **CSD** was first mailed on September 30, 1979.

CSD was especially important in that first year because friendships and independent communication channels had not been created; hardly anyone in the new industry knew anyone else! The group had one thing in common; they had all attended the first SPTS and it would live in memory as a very unusual event.

First there had been the 'legal action.' The national MDS trade association, learning of the seminar, had sent attorneys to Oklahoma City. Seventy-two hours before SPTS was scheduled to open, a Federal Marshal served Cooper with papers demanding his presence in court less than four hours hence. The MDS group was asking for a restraining order from the court; they wanted the seminar stopped because (they claimed) "**This seminar will teach people how to STEAL microwave television signals that these people have no rights to . . .**". The Federal Judge hearing the case ruled to the contrary, but the threat was obvious; not everyone in the world was going to embrace home TVROs!

The Seminar was a resounding success; in spite of attracting 200 more people than planned for. Television cameras were pressed into service and sessions were 'piped' out of their lecture rooms into adjoining rooms so the overflow crowd could attend one-room-removed. A special room was set aside for those attendees who had brought their own VCR units and the TV camera feeds were 'looped' (and looped and looped) from

machine to machine; more than 50 of those attending would leave with more than 40 hours of videotape; every session held had been recorded for later study!

**After the Seminar, the let-down.** What to do first?

A high percentage of those attending came because they wanted a TVRO of their own. To most, the possibility of building or assembling systems for others, as equipment dealers, had never crossed their minds. Most would leave Oklahoma City with a new perspective and ultimately several hundred would become dealers. **Many would also become OEMs**, turning out antennas, feeds, and receivers. If you conducted a survey of the leading firms in the business today, you would find that no fewer than 50% had some member of their firm attending one of the first three seminars the industry held that first year; Oklahoma City in August of 1979, Miami in February of 1980, or San Jose in July of 1980.

**The two most popular people** immediately following the Seminar were **Robert Coleman** and **Taylor Howard**. This duo had the 'secret' to building terminals and between their two manuals, first distributed at SPTS, there was a wealth of data impossible to find elsewhere. Most of those attending set out to get their own, first systems, operational first. Even if they would ultimately become TVRO dealers (or distributors), they had to have a system of their own to get the process started.

We have already visited the shortage of equipment and the lack of home-oriented hardware. Just finding equipment was the largest challenge; far more of a challenge, it would turn out, than installing the system and making it play! The two home-style receiver suppliers who debuted at Oklahoma City (AVCOM and ICM) were woefully behind in production deliveries before the first day of SPTS orders was over. The exhibit hall in Oklahoma City, with all 8(!) exhibits, was barely 2,500 square feet. It didn't take long to inspect everything offered for sale.

Dexcel was one of two LNA suppliers there (SCI was the other). Dexcel had a special 30 dB gain LNA which 'they said' made excellent sense for home TVROs. It would have, had the downconverters been capable of being separated from the receivers and placed outside.

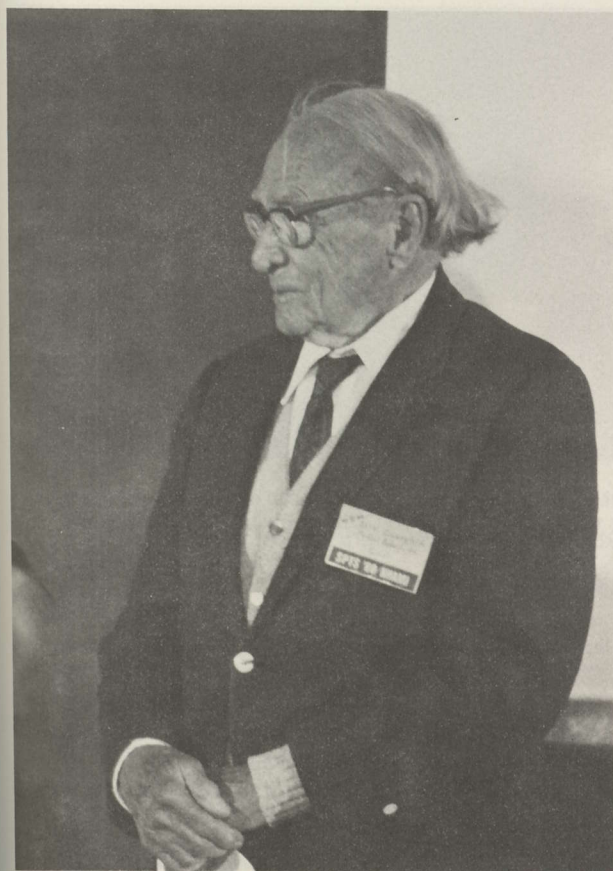
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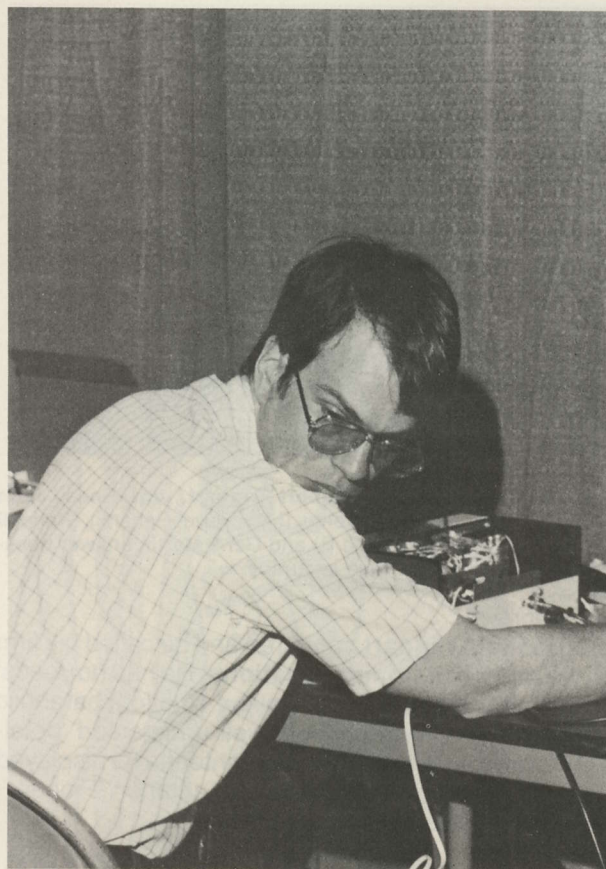


**FATHER OF IT ALL/** Dr. Vladimir Zworkyin accepts applause from Miami crowd after being introduced by Instant Replay's Chuck Azar.

Dexcel had relied heavily on the advice of **H. Paul Shuch**, an early receiver designer who consulted for ICM, and Shuch was convinced of something called 'balanced gain'; he liked to see equivalent receiver-system gain at (1) 4 GHz (the LNA), (2) 1.2 GHz (the high IF, as these were double conversion receivers, and (3) 70 MHz (the now standard low IF). Shuch's 'plan' may have been sound, but it would ultimately fail to fly as TVRO users opted for the standard 50 dB gain LNAs and ultimately no high IF at all.

Dexcel did make a number of major contributions to the early field; perhaps a sign, mounted on their table top display in Oklahoma City will be remembered the longest.

**Art Kawai**, mindful that (even then) 'package price' was the name of the game, noticed that his LNA, an ICM receiver, and an antenna by Kintech totaled just under \$4,000. A sign was created headlining "**The \$4,000 Earth Station Is Here!!**". That sign, and much else at SPTS, caught the eye of a television crew sent to cover the event for NBC News. The NBC project, ultimately to be shown on Christmas eve in 1979 on a short-lived **Tom Snyder** 'Saturday Magazine' look-alike to Sixty Minutes, keyed off of the Scientific-Atlanta installation at the Bell Ranch in New Mexico, and the SPTS event in



**WORK DAMN IT!/** A frustrated Clyde Washburn spent the majority of his Miami experience trying to get TV pictures out of his new receiver. The culprit? A local TV channel 4 signal, in the 70 MHz IF band, wiped out the satellite TV reception. Washburn promptly corrected the problem after the show.

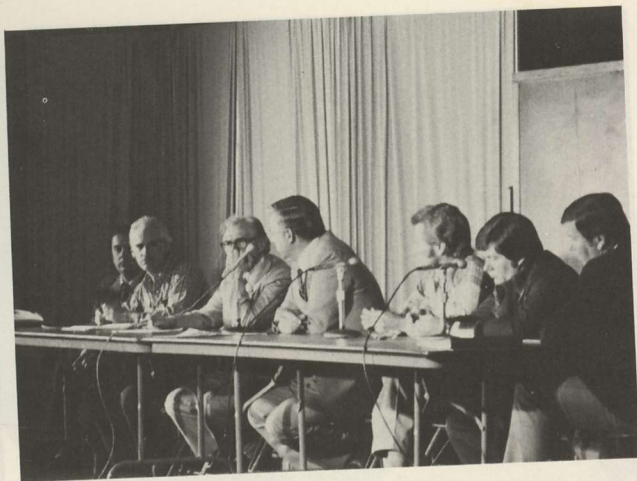
Oklahoma. Featured in the report were Taylor Howard, Coop, and a series of shots done at the Virginia home of Andy Hatfield; only the Hatfields were never identified. As the voice-over video said "... **the legality of all of this is in great question** ...".

If hardware and marketing did not come into focus during the fall months of 1979, the Miami SPTS in February presented a new opportunity. Much happened there which would give the industry direction for several years.

- 1) **Clyde Washburn** and **John Ramsey** appeared; Ramsey would build and sell a receiver (the Washburn Receiver, ultimately to become The Earth Terminal Receiver) which Clyde had designed.

The Washburn receiver was the first 'new from scratch,' single-designer effort for the industry. It was (as it is today) a double conversion unit with few compromises. Washburn, an RF design engineer from The Harris Corporation, had set out to build 'the ultimate' receiver. Its performance was superb, or would be after initial production bugs were eliminated, and it offered the first optional 'stand-alone' downconverter so the installer could place the downconverter close to, or at,



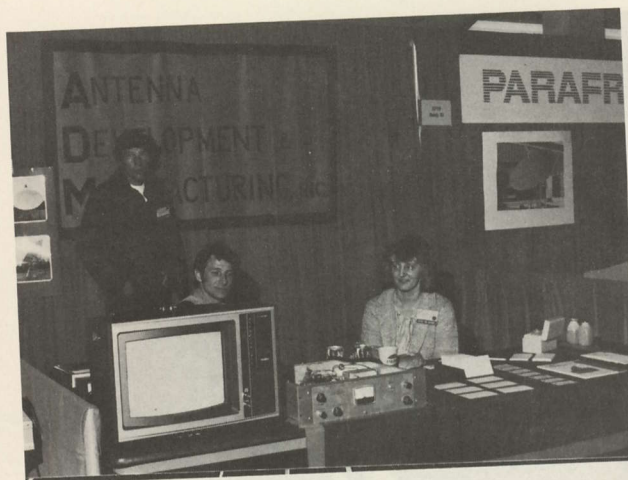


MIAMI ANTENNA PANEL/ Robert Taggart, Jim Vines, John Thomas (Lindsey), Chuck Colby (Microwave General), Randall Odom, John Hastings (H and R) and Gene Martin answer questions about antenna surface accuracy.

the antenna.

- 2) **Robert Taggart** appeared and he called his firm **Chaparral Communications**. He had no 'feeds' at the time, but he did have a 10.5 foot parabolic reflector using his now well understood 'petal-bolic' design. The very first antenna he displayed would be sold in Miami to another 'Pioneer'; **David Brough** of Canada.
- 3) **Robert Behar** appeared, as **'AB Electronics'** offering his own version of the ICM-style receiver and his own version of a Paraframe-like antenna. Behar's firm would ultimately become **Hero Communications**.
- 4) **Richard L. Brown**, who would coin the term 'SPACE' (Society for Private And Commercial Earth stations) appeared and explained to attendees what legal hurdles they faced, as a new industry. A new antenna supplier, **Gene Martin** (STAR Antennas) would volunteer to head up the SPACE organizing effort between the Miami show and the next one, scheduled for San Jose in July.
- 5) Using a 13 foot STAR dish and a 16 foot Paraframe dish, the first-ever international reception from Intelsat was 'done' in Miami. On a chilly night in the front parking lot of the Bayfront Park Auditorium, 'less than perfect' but still very watchable reception from 'Rede Globo' in Brazil materialized. The effort started off looking for the fabled Russian G(h)orizont transmissions but stopped when the first 'video signal' from the east was found.

The significance of this was more apparent to the 50 or so 'delegates' attending from Central and South America than the 'gringos' present. This proved to them that even in areas where US domestic (DOMSAT) reception was not practical that Intelsat (Global) beams could be received with antenna systems which were



ADM at their first show; **Jamie Gowen** (barely visible behind monitor) was already using **AVCOM** receivers for his displays.

'manageable' if not truly small.

CSD for March 1980 (included in CSD Anthology, Volume One) wrote:

**"One antenna manufacturer wrote on-the-spot orders for more than 200 units while a second antenna manufacturer had been asked to bid on an order for 1,000 antennas . . ."**

The '1,000 antenna bid' would later turn out to be from **Heathkit**; they had representatives on site and were very excited about getting into the TVRO business. Ultimately, their entry would be in concert with Scientific-Atlanta.

**"An LNA supplier wrote on-the-spot orders totaling an estimated \$100,000 . . ."**

LNAs, by the way, were in the \$1,000 price region for 120 degree units at the time so the dollar amount actually amounted to around 100 units(!).

**"A receiver supplier wrote orders for more than 250 units and reports his firm is developing bids for an additional 450 units as a direct result of SPTS . . ."**

THAT receiver supplier was the Ramsey/Washburn duo which would, in about four months time, no longer be a duo; both would have gone their 'separate' ways and Washburn would ultimately team up with **Cincinnati Microwave** while Ramsey would strike out with his own 'low-cost' TVRO receivers.

CSD also noted:

**"We estimate that no fewer than 750 brand new private terminals will be installed as a direct result of orders placed during SPTS in Miami . . ."**

If the smallness of that number fails to impress, remember that at this point in time, the total-TVRO-universe was under 500!

And finally, the actual, real inventor of television, **Dr. Vladimir Zworykin**, dropped by for a two hour visit during the Miami show and one of the most touching pieces of videotape you will ever see occurred as **AVCOM's** Andy Hatfield escorted the inventor of television (then past 90 years of age) around the exhibit hall



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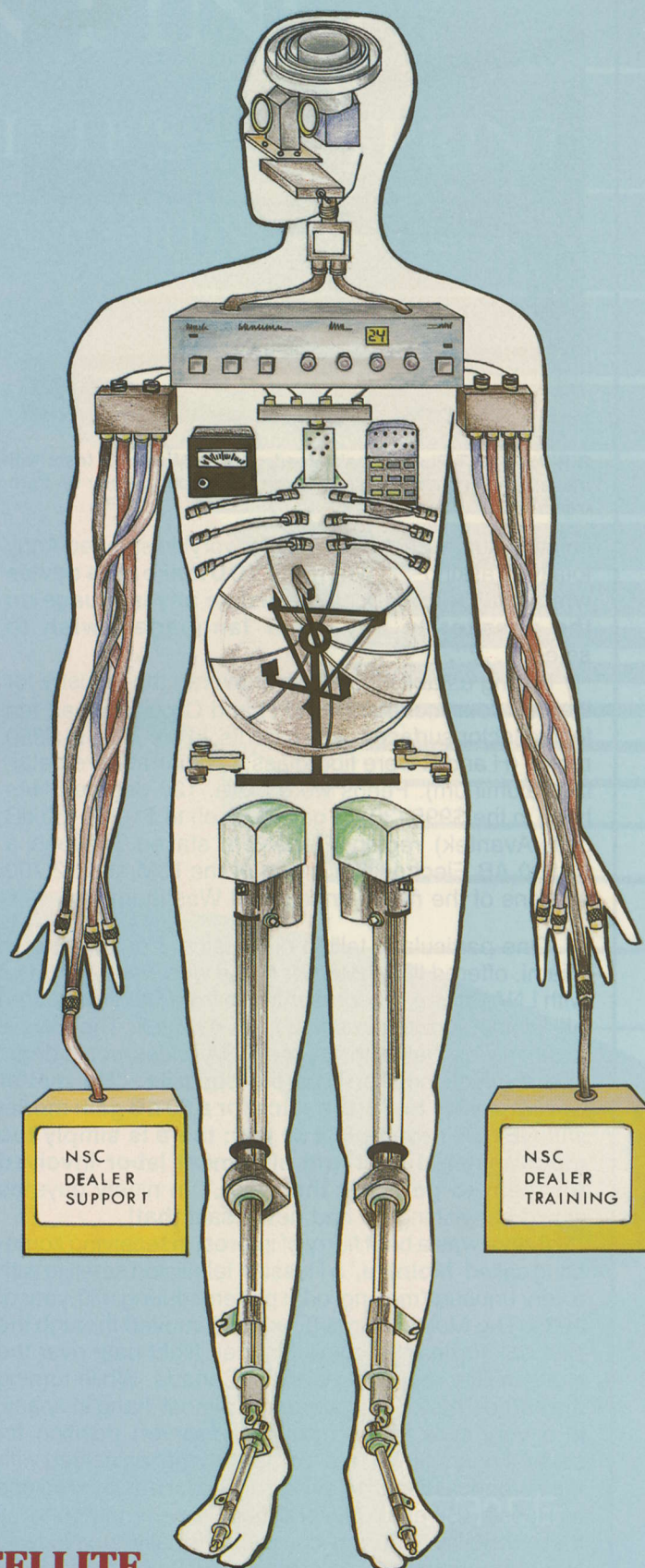
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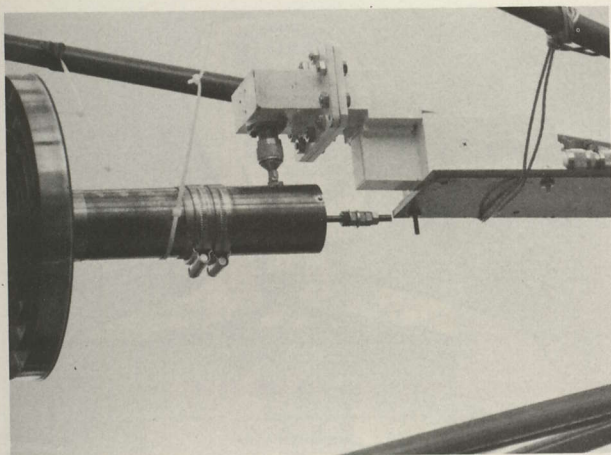
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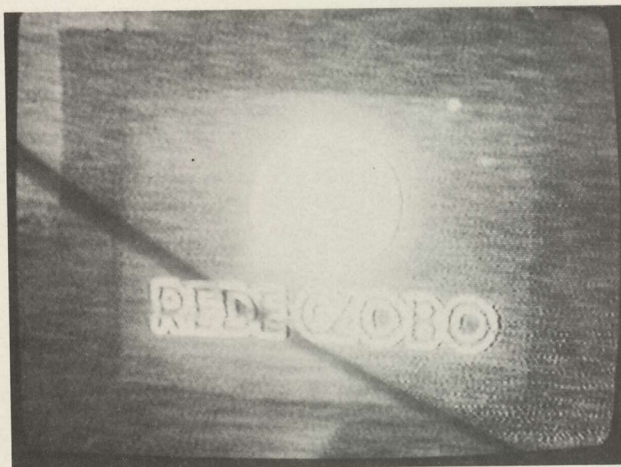
BIRKILL FLAT PLATE scalar feed, sent to Miami for tests with Intelsat, connected to LNA through 'interface' coupler on Para-frame dish.

pointing out the technology. Dr. Zworykin stopped Andy totally by asking '... when will YOU make me a device which will automatically translate any language on the speaker to any other language I wish to select...?'.

Pricing established at the show ran the industry for the next four months. H and R and Chaparral had ten foot reflector surfaces, with mounts, in the \$750 to \$850 region (H and R were fiberglass; Chaparral were petalized aluminum). Feeds were extra. 120 degree LNAs hung in the \$995 (30 dB gain Dexcel) to \$1,200 (50 dB gain Avantek) region. Receivers stayed between a \$1,800 AB Electronics version of the ICM and \$2,700 versions of the newly announced Washburn unit.

One particularly telling discussion, from a panel in Miami, offered little hope for those who were still upset with LNA pricing. A representative from Dexcel squared off against a representative from Avantek. The Dexcel position was that 'with volume, LNA prices would drop.' The Avantek position was the opposite. **"No matter how many we build, the price for a 50 dB gain model will NEVER drop below \$1,000; there is simply too much material cost and alignment labor involved for them to go lower than that."** In ninety days he would be wishing he had never said that!

There was a brief flurry of interest in receiving something called 'Molniya,' a Russian television satellite with a very unusual 'moving' orbit pattern; during mid-year of 1980. The Molniya birds (four in all) moved through the sky, but 'turned the corner' in their flight path over the Hudson Bay region of northern Canada. While turning the corner, they would appear to almost 'hang in space' in a very slow moving (to the observer) position for several hours time. This 'corner-turning' coincided with their broadcasting of television to the far eastern regions of Russia (Siberia). Several people were intrigued by the possibility that you could be virtually anywhere in North America (then, as now) and tune in 'internal Russian television.' Coop first found the Molniya birds from



REDE GLOBO from Brazil actually became almost perfect as the systems were tweaked. This was a first; international (Intelsat) reception on a 'small' terminal. Intelsat terminals in those days were 60 feet in diameter and up.

his Oklahoma location in mid-May of 1980 and subsequently hundreds would follow his Molniya data and also tune in the unusual Russian bird's TV signals.

International reception was starting to be interesting; Taylor Howard had designed a receiver with a switch and that switch allowed the user to select between 'American standards' television and any of several other standards in use in the world. Australia would be where the first of these receivers would go; a product from ICM.

The interim between Miami and San Jose also saw the sudden popularity of a new style of antenna. It was called 'The 8-Ball' (!) and it was the product of **Hayden McCullough** of Salem, Arkansas. McCullough had been a devoted student of the late **Oliver Swan** and when Swan died McCullough carried on. Swan's initial antennas were very large; McCullough had continued the R and D work and had designed first a 12 foot and then a 10 foot version. Before it was all over, he would have the antennas down as small as 6 feet and the 10 foot version would go out the door for under \$400. This pricing structure enticed thousands of people to try their own hand at building a TVRO and McCullough's 8-Ball probably introduced more 'new people' to TVRO than any other single product in 1980.

The appeal of the 8-Ball was both price and simplicity. It came from McCullough as a 'kit' and in about 8 hours time you could be watching satellite TV. Because the dish reflector surface was 'fixed' and you moved the feed, independent of the dish, McCullough (as Swan had pointed out a year earlier) advertised that one reflector could bring you two or more satellites at one time; each with a different feed and LNA.

While Hayden McCullough was making life simpler, Taylor Howard and Robert Coleman were fine tuning the basic systems. Howard and Coleman, for example, used CSD to explain how something called 'image noise' could be eliminated. It seemed that early LNAs

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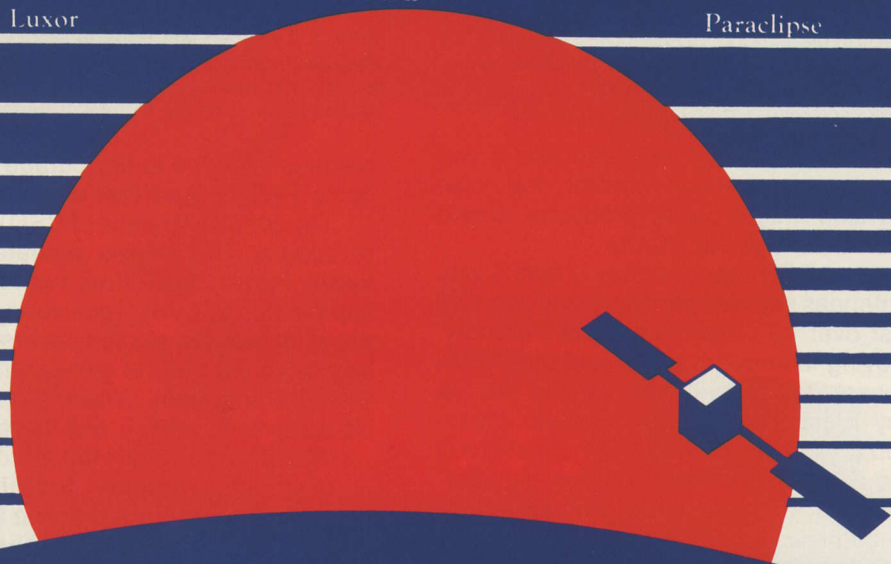
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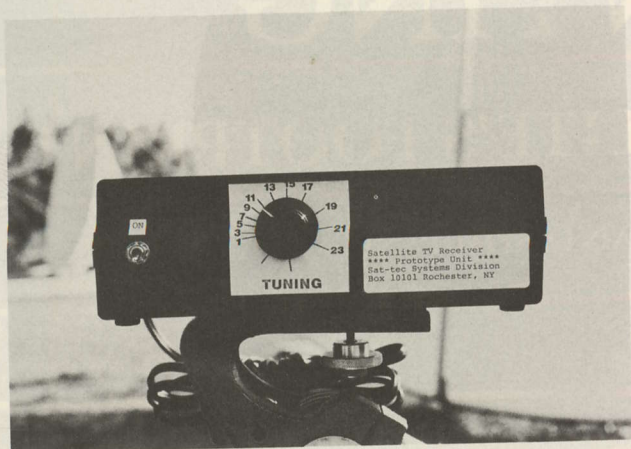
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FIRST SAT-TEC/ prototype sent to CSD magazine was used for reception of Russian Molniya bird as well as for domestic reception. It worked, well, and the \$995 price was attractive (paper front label because of proto-type nature of unit shown).

were quite 'broad' in frequency response and if you wanted to use a 'single conversion receiver,' the noise from the 'image side' might cause problems. **David Barker** would sort all of this out shortly.

The May issue of CSD reported that H and R was averaging 2.5 antennas shipped per day (!) and that ICM had shipped just over 100 receivers since February. AVCOM was moving to larger quarters and the Washburn receivers were having problems getting out the door at Ramsey Electronics. Taylor Howard, meanwhile, had signed an agreement with a Canadian group to produce up to 5,000 of his (new) receiver per year. The **order numbers** sounded large; the **shipment numbers** continued low.

Into this Sat-Tec announced that they would show, in San Jose, a **\$995 priced** wired and tested receiver and they would offer the same receiver as a 'kit' for \$695. The kit would last only a short time as Ramsey quickly learned that de-bugging somebody else's bungled wiring job was not a very good way to run a corporation. The \$995 priced receiver would, however, send price-shock waves through the industry for months.

People were still trying to build their own LNAs and Bob Coleman and California inventor **Bob Luly** were working on several new designs. **Mitsubishi** had announced a new GaAs-FET with a 0.8 dB noise figure and a \$75 price tag. That was outstanding news since the best noise figures available previously were in the 1.0 dB region and the best prices in the \$250 up region. This all suggested big changes in LNA performance and pricing in the months ahead.

It was also in the May CSD that Coop wrote a piece outlining how the home TVRO industry could create their own 'premium movie service channel,' programming it for the home terminal viewers (yet to come) and how that would offset the loss of HBO and other premium signals 'when they scrambled.' News releases from HBO, Showtime and others '**warned**' that **scrambling was coming** 'soon'; announcements



8-BALL's Hayden McCullough talks with another early entrant; George Jones (right). Jones tried to field a TVRO distribution plan but the hardware was not available when George was. Jones recently launched the Conifer home system package.

perhaps intended to discourage people from acquiring home TVROs. **And that was nearly 3-1/2 years ago!**

The June 1980 issue of CSD was a classic for several reasons. Two articles appeared, back to back in the same issue, outlining two innovative and new approaches to TVRO receiver design. **Norman Gillaspie** wrote about a single conversion receiver system he had designed and he gave complete construction details for the system. Gillaspie offered circuit boards for his receiver for \$35 (!) and there was this warning:

**"All single conversion mixers have some degree of image problems; the phase-locked loop demodulator included in the Gillaspie receiver circuit minimizes, but does not eliminate this problem . . ."**

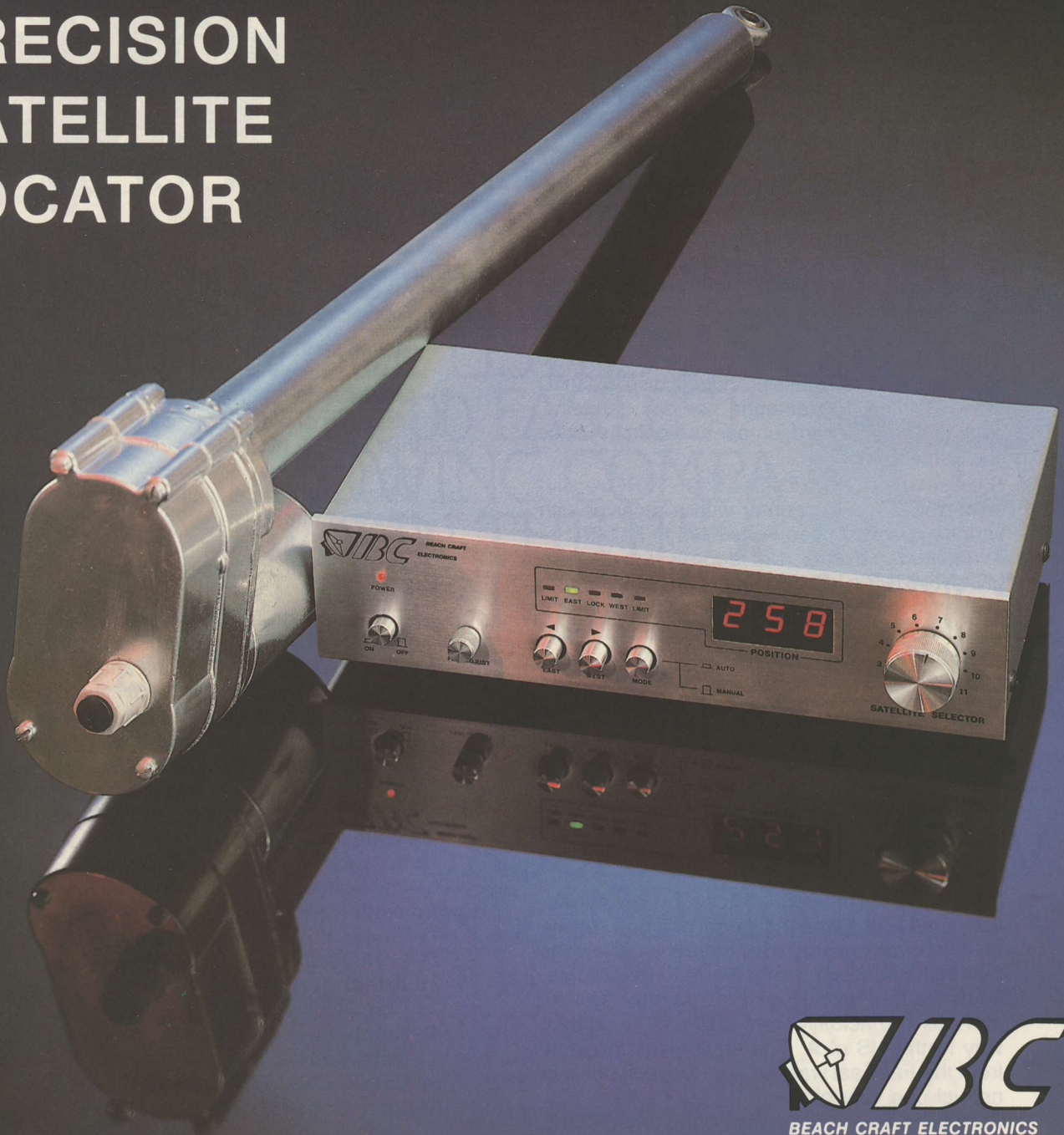
The next article took care of that. It was penned by Arizona experimenter **David Barker** and Barker had worked out something called the '**Image Rejection Single Conversion Mixer**.' Barker's scheme went back to basics and he showed how the receiver builder could have one step conversion from 4 GHz to the common 70 MHz IF, and virtually no image problems, by 'canceling the image' in a special mixer circuit. Barker called his system the '**Superverter**' and he explained it was possible to have pictures by sticking a 50 dB gain LNA in front of the 'Superverter' and a phase lock loop demodulator after it; although he urged that you use some 70 MHz (gain) circuits as well. He, also, offered his circuit boards for sale for a pittance and a complete Superverter package for \$300.

Both Gillaspie and Barker appeared at the San Jose 4th of July SPTS. In fact, both appeared on the same SPTS panel session and each took some delight in taking engineering potshots at the other. In the audience, however, were representatives from **KLM**, a California firm that manufactured Amateur Radio amplifiers and antennas. KLM saw something significant in the Barker circuit and before Barker left San Jose, his design would have been licensed to KLM. Gillaspie would



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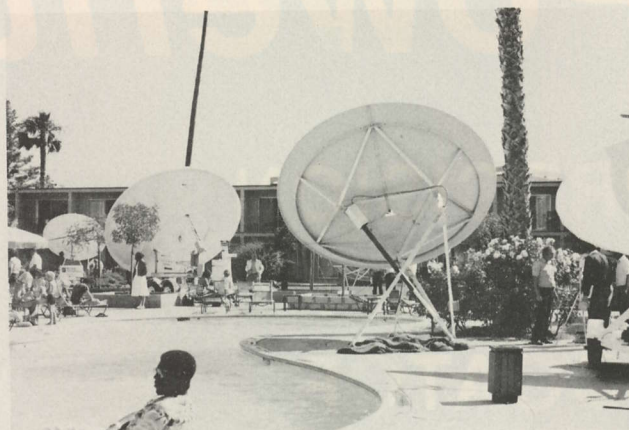


enter the receiver business on his own and ultimately he would adopt the general approach of Barker.

In fact, virtually an entire industry would 'switch' rather than 'fight.' Quietly, AVCOM receivers would gradually change to a Hatfield version of single conversion; Sat-Tec and ICM would hold onto the double conversion format the longest.

San Jose, with the single conversion receiver bombshell, had its place in history. But there were other innovations there as well. Plus some indications of the future.

- 1) Chaparral, now Robert Taggart and Taylor Howard, introduced their '**Super Feed**,' the first flat-plate-scalar feed system for the TVRO industry. Taggart also displayed, for a second time, his petalized TVRO antenna system but the reaction to the Super Feed would be so overwhelming that he would shelve antennas for all time after San Jose.
- 2) Tristar General would introduce a **Prodelin** 10 foot dish, the first 'mass produced' dish in TVRO (they claimed 100 antenna per day capacity). With this step forward, antennas would never be the same again.
- 3) Sat-Tec would offer for sale a \$995 TVRO receiver and ICM would counter with a receiver with various options priced from \$995 to \$1149.
- 4) Avantek would offer 120 degree, 50 dB gain LNAs for **\$795** in lots of 10 and there were rumors of even lower prices (such as \$645 in lots of 50). CSD forecast "**We bet the LNAs drop to under \$500 soon . . .**". It wouldn't be long.
- 5) A fellow named **John Rohner** from Iowa would advertise, but fail to show nor deliver a \$1500 (dealer net) receiver which he claimed had an LNC plus fully tuneable audio. What he couldn't produce and deliver caused other engineers to **think about** what they COULD produce and deliver and within six months the features Rohner 'dreamt of' would be found in many receivers in the field.
- 6) **SATRX**, a firm with 'offices' in Honolulu, appeared with a working model of a new receiver. What was unusual was that the receiver was built in the Far East; **Hong Kong to be precise**. They talked about delivering thousands; perhaps 100 actually were built and found their way to the US of A. The equipment 'invasion' from the Far East was 'on' and the industry was not yet one year old!
- 7) **Comm-Plus**, and a second company (**ICON**), were on hand to show off the first Canadian built TVRO receivers. Comm-Plus principals included **Chris Schultheiss** who would later emigrate to the United States to become the editor for **STV Magazine**. Comm-plus was about a year ahead of the rest of the industry at the time, but they suffered (as did many early firms) from (1) operating cash, and, (2) an adequate, trained, pro-



**POOLSIDE at San Jose . . . the industry attracted perhaps 800 people to its third 'show' the first year, and boasted more than 30 exhibit booths.**

- duction staff. Getting from finished proto-type to dozens of anything per day was no easy step.
- 8) **AMPLICA** came to their first show and perhaps misjudging the direction of the market, displayed their LNA by mounting it inside of a fish tank to prove it would work when wet. Amplica had worked out their pricing structure prior to San Jose and the sudden \$795 price from Avantek caught them by surprise. People remember their fish tank, but not their price. They didn't sell many.
  - 9) **SPACE** got started. For real. Richard L. Brown detailed **HR 7747**, a bill introduced by Congressman Preyer of North Carolina and when he got to the part about \$250,000 CASH fines for anyone 'caught' using a terminal to tune-in unauthorized signals, everyone sat up straight. Brown pointed out that if there was such a law, future TVRO shows, if held, would have to skip showing off satellite TV since the **mere act of tuning** through a satellite, in public, would be a \$250,000 offense.

The first Board of Directors for **SPACE**, with Taylor Howard as the (reluctant) President, was as follows:

- 1) **Taylor Howard**, San Andreas, Ca.
- 2) **L. Russell Keene, II**, Sulphur, La.
- 3) **Arthur Terwillinger**, International Microwave Corp., Cos Cob, Ct.
- 4) **Ralph Payne**, Hubbard-Payne Communications, Knoxville, Tn..
- 5) **Gerald Logue**, Eagle Video, Calgary, Alberta
- 6) **Sam Conwell**, S.E.S. Of Northern Virginia, Chantilly, Va.
- 7) **Bob Dunlap**, Private Satellite Television, Inc., Charlotte, NC
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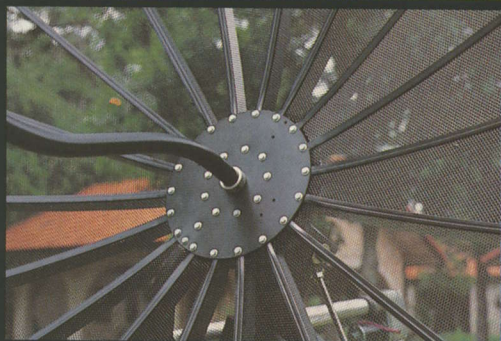


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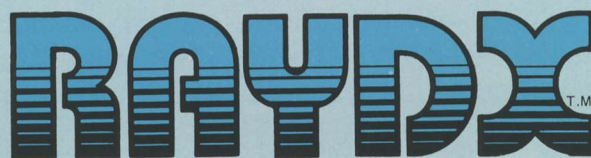
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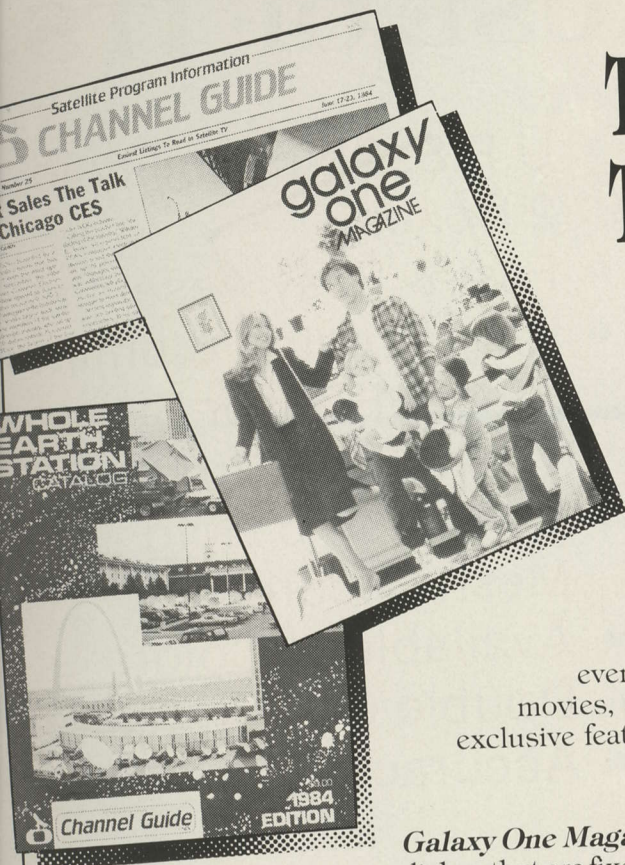


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**Eclipse Electronics, Inc.** 1739 28th Street S.W., Wyoming, MI, 49505, 616-538-7148.  
**International Video Communications Corp.**, 4005 Landski, North Little Rock, AR 72118, AR: 501-771-2800.  
**Mid American Telecommunications**, 420 North Lancaster, P.O. Box 629, Hesston, KS, 67062, 316-327-4243.  
**National Microtech West, Inc.**, 510 29½ Road Grand Junction, CO 81504, 1-800-223-8967, 800-321-2417.  
**National Satellite Communications**, 21 Century Park, Clifton Park, NY, 12065, 518-383-2211, 1-800-821-8659, NY Watts: 1-800-522-3538.  
**National Satellite Communications**, 10779 Satellite Blvd., Orlando, FL 32821, FL: 305-851-4738, FL Watts: 1-800-821-8659, Out of FL 1-800-322-4044.  
**Precision Satellite, Inc.** 715 Grove Street, Clearwater, FL, 33515 1-800-HOT-DISH or In FL 813-441-9438.  
**Quarles Satellite Systems**, 1616 Calhoun Road, Greenwood, SC, 19646, In SC 1-800-922-9704 or Out of SC 1-800-845-6952.  
**Spectrum Satellite** 3200 Sunnyside Avenue, Burlington, IA, 52601, 319-753-0176, In IA 800-582-0200.  
**Universal Satellite** 3050 Territorial Road, Benton Harbor, MI 49022, 616-925-0143, 616-926-1939.  
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Ask our customers in all 50 states and 10 foreign countries. The answer is always the same. Intersat produces the TVRO system that outperforms all others.

More features. More performance. More quality. Less price. We always go that extra mile. The more you see, the better we look.

So when you want to show off, do it in style. Remember, good quality never grows old, nor bad. We make satellite equipment you can bet on, so why not have the whole enchilada?

The innovators in satellite technology.  
Count on it.



# Happy 5th Birthday

Jammy Crownover

Happy BIRTHDAY  
Jim Lynn

Nemeth Dalton

Kyle Stalder  
Anthony Con

Happy B-Day  
Barbara  
Bunker

Donna Lynn  
Dinda French

RON BRUNER  
GAR! Schoene

Cheryl Robertson

Happy B-Day  
Shirley K.

Deirdre Robinson

Happy B-Day  
Bobbie Beattie

Tom Colwell

Happy Birthday  
Dana Pland

Happy Birthday  
B.P. N.

Happy Birthday  
Betsy Schack

Happy Fifth

Don Longmire

Kenn L. Wentzel

Carol Davis  
Jack Wheeler

Happy Birthday  
John T. Boudreau

Happy Birthday  
Patty McCarthy

Joe A. Aust

Happy Birthday  
Pam Beckham

to many more!

James Ford

Happy Birthday  
John T. Boudreau

HAPPY  
Dana

Mr  
B

Happy

Happy

Jim

Jeff F

margaret

Harriet

Carolyn Ha



# TVRO

from everyone at

INTERSAT<sup>TM</sup>

Happy Birthday  
Denny Walton

Happy Birthday  
Mark Hunter

Happy Birthday  
Mark D. Altman  
Bob Jackson

Happy 5th to TVRO  
Bill Bishop

Happy Birthday  
Steve Buckley

David Oliver

Happy Birthday  
Julie Kenyon

Happy Birthday  
Dennis Stoberman

Happy Birthday  
Kevin Holscher

Happy Birthday  
John J. Jones  
John J. Jones

Happy Birthday  
Frank Collins  
Don Osterlander

Happy Birthday  
Kathy Wilke

Happy Birthday  
Carol Owens

Steve Coshen

Nate Conant

Harold Mott

Happy Birthday  
Samoy Jones

Happy Birthday  
Mike Wright

Happy 5th  
Dennis Hops  
Jim Riley

John C. Lombardo

John Harner

Happy Birthday  
Debra White

Happy Birthday  
Garry Ross

Happy Birthday  
Don Brunner

Happy Birthday  
Mark Dillon  
Happy Big "S"  
Mary Powell

Happy Birthday  
Dennis A. Church

Happy Birthday  
Frank F. Weaver

Happy Birthday  
Karen Conant

Happy Birthday  
Mark A. Hansen

Happy Birthday  
John McCarley

Ray Zitz

Happy Birthday  
a good  
H. Pennot

Happy Birthday  
M.R. Headworth

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Deeann

Happy Birthday  
Kelly Mobley

Happy Birthday  
Mike Conant

Happy Birthday  
John H. 5th

Happy Birthday  
Jim Matthews

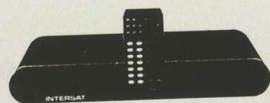


# INTERSAT<sup>TM</sup>



## IQ-160

INTEGRATED SATELLITE  
RECEIVER SYSTEM



Until now, you almost had to be a Microwave Expert to operate your home satellite system. Then the Intersat IQ-160 came along.

This genius has become known as the most electronically-sophisticated, revolutionary member of the TVRO community. The IQ-160 has done its homework, and knows how to solve your most complex TVRO problems.

Micro-processor based, the IQ-160 has more memory capacity than most home computers—offering you 16 pre-set timer commands, parental lock-out for objectionable programming, and video-displayed "menus" for each satellite—all at your command with the hand-held Infra-Red Transmitter. So it does all the hard work, while you barely lift a finger!

And the IQ-160 came prepared. Now that there is stereo capability in most satellite transmissions, it offers you multiple stereo formats—bass, treble, and balance controls—and a 12-watt amp already built-in.

And with Intersat's reputation for innovative quality and performance, you're already at the head of the class!

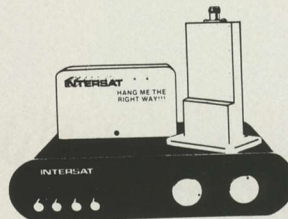
The Intersat IQ-160 . . . You don't have to be a genius to own one!

**YOU DON'T HAVE TO BE  
A GENIUS TO OWN ONE.**

# INTERSAT<sup>TM</sup>



## BABY "Q"



As any Television-Receive-Only (TVRO) consumer knows, high quality, esthetics, and first-class performance normally means high price.

Then along came Intersat's Baby "Q," and everything suddenly changed.

A sleek, modern design, coupled with more than two years of research and development, and the new kid was born. No time was wasted in growing up. In a matter of weeks, Television-Receive-Only (TVRO) consumers were watching the Baby "Q" turn out top-quality video, just like the big guys.

And the price? Well, this is the moment of truth, so expect to be pleasantly surprised.

Yes, the kid is making quite a name for himself. When you have the excellence he has, the rest have to try to live up to it. But we doubt they can.

The Baby "Q." Born to please. It's far beyond its years. Get a grown-up picture at a little kid price!!

Shouldn't you be Baby-sitting tonight?

**GET A GROWN UP PICTURE  
AT A LITTLE KID PRICE.**

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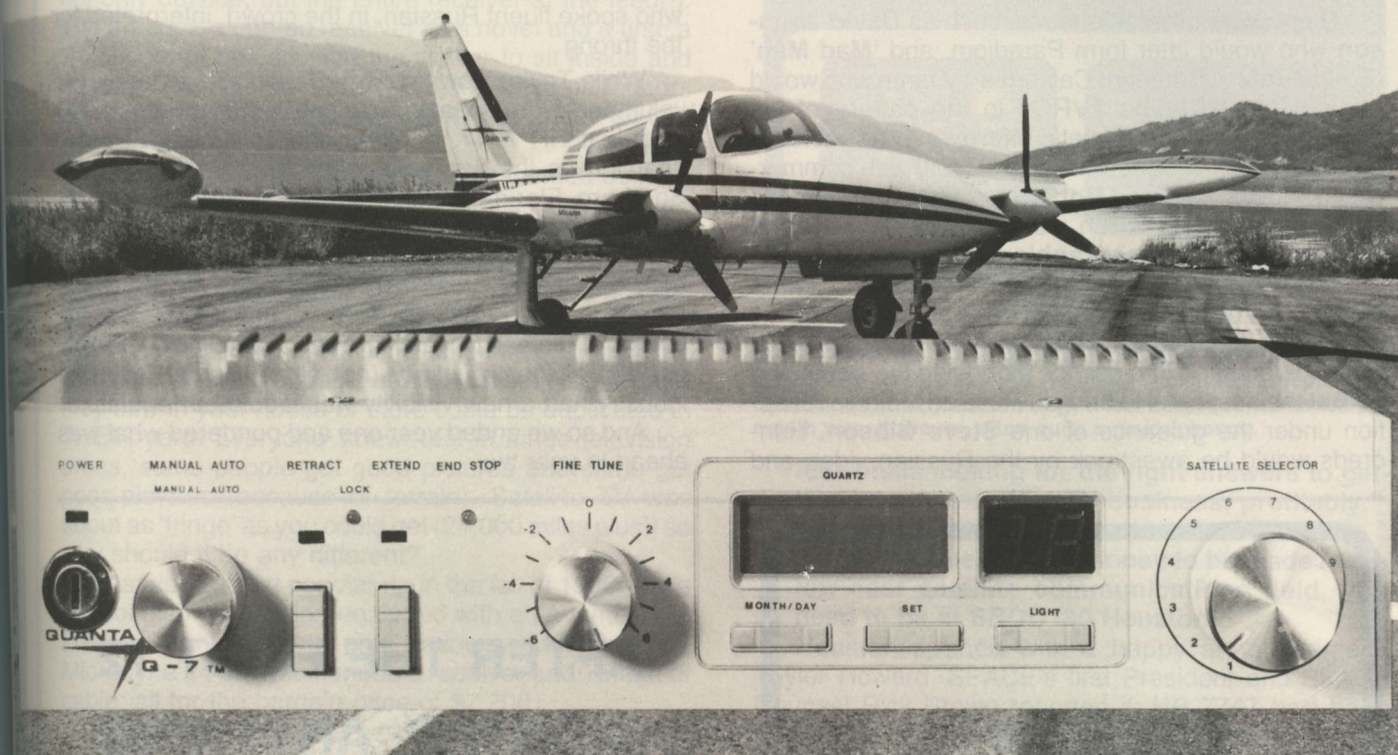
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- Retro-fits ea
- ly for young
- Quanta® G
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**NOW!! FLY FROM SATELLITE TO SATELLITE  
WITH A  
QUANTA® Q-7 36DC**



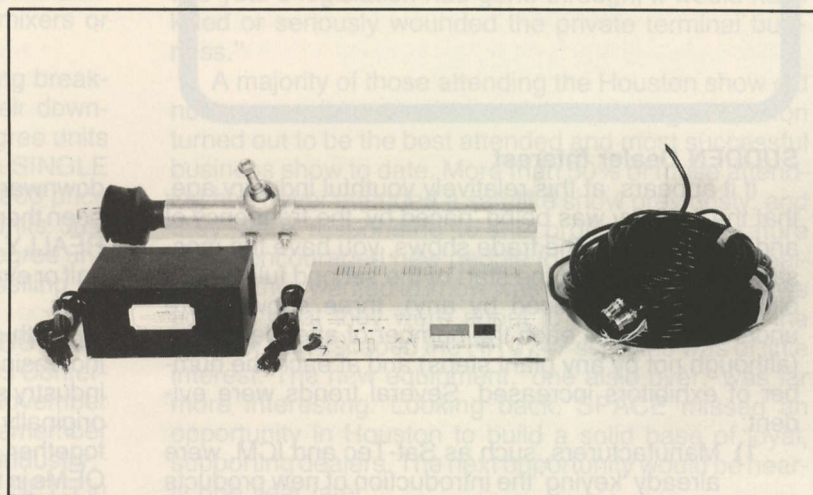
Ask only for a

**QUANTA® Q-7**

**Programmable Satellite Scanner  
New 36 Volt DC — 18" and 48" Models**

Quantum Associates, Inc. not only originally engineered the Q-7, but also re-engineered the Quanta® Q-7 with all new features:

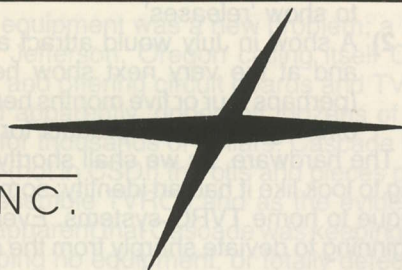
- Adjustable Electronic End Stops. Non-volatile memory, prevents run-a-way dishes.
- Key Lock, full swivel adaptor clamps, 100' cable, weather boot, warranty, all included.
- Twelve-position Satellite Programmable Selector for simplicity, and manual scan switch with LED read-out for a 3-way (no computer failure) back-up system.
- Retro-fits easily on all existing dishes and operates easily for young and old. (No computer training)
- Quanta® Q-7 offers more equipment for less money than any drive on the market.



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ASSOCIATES, INC.

Alpine Airport  
Alpine, Wyoming 83128





- 10) **Clark Mihelko**, Fallbrook, California
- 11) **William F. Asip**, Asip Associates, New York, New York
- 12) **Robert Coleman**, Travelers Rest, SC
- 13) **Bob Cooper, Jr.**, CSD, Arcadia, Oklahoma

There were other attendees; such as **David Johnson** who would later form Paradigm, and '**Mad Man**' (Earl) **Muntz** of Southern California TV fame who would attempt to sell home TVROs in the pattern of his stripped down home TV sets, **Microwave Associates** (making their first appearance to exhibit) with commercial style receivers, and **Bob Luly** and his now famous 'Umbrella Antenna' which would ultimately grace the pages of **National Geographic Magazine**.

This was also the second show for **ADM** and **Jamie Gowen** had become a fixture at trade shows with his 11 foot petalized antenna. It was an ADM antenna which would be pressed into service alongside the swimming pool at the host hotel to bring in Russian Molniya reception under the guidance of one **Steve Gibson**. Hundreds would be awestruck by the Russian video and

using a box built by Gibson, the difficult 'sound-in-synchs' audio would pour from the speaker. A scheduled transmission which tore into the American 'CIA' that first evening made everyone watching glad they lived in the USA; it plainly distorted American activities as several who spoke fluent Russian, in the crowd, interpreted for the throng.

While Taylor Howard, Rick Brown and a handful of volunteers were engaging in a battle in Washington, DC to defeat HR 7747, another kind of fight caught our attention as the first year rolled to a close. Down in Southern Florida, dealer/distributor **Bob Behar** installed a series of TV screens outside in his parking lot and tuned in the Leonard-Duran satellite carried boxing bout. The contest was only available in closed-circuit showings but a crowd estimated at 600 gathered in the streets of Hialeah to watch it 'free' on satellite TV. Behar got alot of local publicity (not all of it good) and the industry had a new visibility with would-be regulators.

And so we ended year one and pondered what was ahead in year two.

## YEAR TWO/

## AFTER THE FIRST 12 MONTHS, ANYTHING SOUNDED GOOD!

### SUDDEN Dealer Interest

If it appears, at this relatively youthful industry age, that the industry was being 'paced by' the frequency of and attendance to the trade shows, you have the message. As we entered the start of the second full year (a birthday scantily noticed by any), three shows were under our belts. At each the number of attendees rose (although not by any giant steps) and at each the number of exhibitors increased. Several trends were evident:

- 1) Manufacturers, such as Sat-Tec and ICM, were already 'keying' the introduction of new products to show 'releases'.
- 2) A show in July would attract an 'entrepreneur'; and at the very next show he would be back (perhaps four or five months hence) as an 'OEM', offering some new product for the field.

The hardware, as we shall shortly see, was beginning to look like it had an identity; something which was unique to home TVRO systems. Even the pricing was beginning to deviate sharply from the commercial gear;

downward of course. The volume may not have really been there, yet, but what was surprising was that it didn't REALLY take THAT much volume to get prices down to half or even a third of the commercial equipment equivalents.

With volume up, and with production capabilities increasing, there was some pressure to expand the industry's base; to find 'more dealers'. The next SPTS, originally planned for early in 1981, was hurriedly put together for **Houston** in November. A survey of the OEMs in the field revealed they actually wanted another show before spring, and more important, they wanted it to be a 'new dealer show'. The industry was growing up.

Bouncing out of San Jose, perhaps the OEM leader was a firm out of Arkansas; **Starview Systems**, which had been formed as an arm of the original H and R Communications that came out of the first SPTS as the nation's first TVRO dealership. Starview had teamed up with industry Pioneer Robert Coleman and with Coleman creating the electronics, Starview put together



some packages which were, in fact, the first one-stop dealer packaged systems.

The 10R is illustrative; a ten foot dish with a new Coleman created receiver that had the downconverter not only outside, but the entire receiver at the feed(!). The antenna mounted receiver was novel and a first; a small control box allowed the viewer to sit inside and change channels, and an NTSC carrier came indoors with standard VHF television on it. The price? **\$4,650 dealer cost.**

Another big seller was the trailer mounted demonstration rig. Here, again, Starview was a leading seller. The typical dealer had a trailer, with a 10 foot dish on it. He sold a system by taking his trailer mounted rig to a prospect's home or office, setting the antenna up, and demonstrating satellite reception. It was an effective way of selling, if somewhat time consuming, and it fit the times; not many prospects actually **believed** that what they saw in your house or store could be duplicated in THEIR yard! Everyone 'knew' that in fringe television areas, some people got good pictures and some got poor pictures (because of terrain). Satellite TV was about as 'fringe' as you could get (24,000 miles plus!) so why should it be any different?

Starview's most popular rig in the fall of 1980 was a 10 foot dish on a trailer, equipped with an Avantek 120 LNA, a TV antenna rotor polarization switching system, Microdyne 24 channel tuneable receiver and 75 feet of cable; all for the bargain price of \$7,200.

**CSD** continued to be parts oriented; there was an on-going 'raw parts shortage' and OEMs building receivers, in particular, were often running months behind intended delivery schedules because they were unable to get an adequate supply of oscillators or mixers or some other 'high tech' part.

LNA pricing, coming off the Avantek pricing breakthrough at the San Jose show, continued their downward slide. By October you could find 120 degree units from Avantek or Dexcel in the \$750 region in SINGLE quantities while AB Electronics broke the \$1,000 price barrier (\$995) for the very scarce 100 degree units. Just one year prior, nobody had ever seen a 100 degree unit except in a laboratory; now here they were selling for less than the 120s of just a year prior.

The big event of the fall would be called **SBOC '80**; an acronym for Satellite Business Opportunities Conference. Houston, Texas was the setting and November 17-18-19 were the dates. Many would later remember the Houston show as a turning point for the industry.

No question, those who attended the first SPTS in August of 1979 were largely technicians and engineers who came to learn, and buy. Subsequent shows (Miami, San Jose) had been heavily dominated by more engineers and technicians. Houston would change that for all time; the Houston show would be an 'entrepreneur show'.

The advertising copy for Houston included phrases such as:

**"A very special kind of Satellite Seminar for Pro-**



**LIMITED PRODUCTION/** good performance. This Robert Coleman design, created for H & R (Starview) featured exceptionally clean video. The transition from a few a week to hundreds per month was, however, often quite a major change.

**professionals looking for the right answers to getting into the satellite TV business; profitably."**

It continued:

**"If you believe there is money to be made in the low-cost satellite communications field, you need to be at SBOC '80 Houston!"**

Houston opened with a happy announcement. Taylor Howard, SPACE's first President and SPACE Counsel Rick Brown reported it; **HR 7747 had been beaten.** But it had been close. Howard wrote in CSD "It is clear to Rick Brown and to me that there will be legislation that affects this entire industry next year. If this year's legislation had gone through, it would have killed or seriously wounded the private terminal business."

A majority of those attending the Houston show did not hear, or did not understand that message. Houston turned out to be the best attended and most successful business show to date. More than 50% of those attending had never attended a satellite show previously, and they were responding to the promotional literature which encouraged new people to become TVRO dealers. All they wanted to know was that there were no laws against what they were about to do; how closely the industry had escaped the HR 7747 scenario was of little interest. The new equipment, 'one aisle over,' was far more interesting. Looking back, SPACE missed an opportunity in Houston to build a solid base of loyal, supporting dealers. The next opportunity would be nearly one year later.

Second-rate equipment was a new problem; a firm operating out of Jefferson, Oregon calling itself Cascade Microwave and offering circuit boards and TVRO components had apparently 'ripped off' dozens of enthusiasts, some for thousands of dollars. Cascade had been advertising (not in CSD!) the bits and pieces people needed to assemble TVROs and as the evidence mounted, it was apparent that Cascade was keeping the money and shipping no equipment, or totally defective



equipment (which upon inspection was found incapable of working).

CSD surveyed its 'Pioneer Subscribers' with their renewal notices and from that survey came a barometer of how the industry had progressed during the first complete year. We reported:

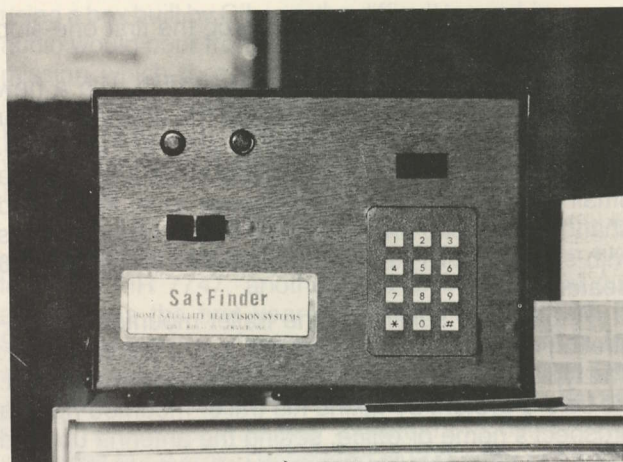
- 1) 71% of the readers (read industry) were pleased with the lowering of equipment prices, 18% were happy to see so much new equipment on the market while others (totaling 100%) cited SPACE activities and the development of specific engineering feats (such as the Barker Image Reject Mixer/receiver) as gratifying.
- 2) However, only 37.8% of the readers had a private terminal operating at their home, after one year of industry activity. That surprised us.
- 3) Of those with terminals operating, 14.3% were totally 'homebrew,' 57.1% were partially homebrew (such as an 8-Ball antenna, which by its kit approach, would have qualified as 'homebrew') and partially commercial. Only 28.6% were totally commercial. Remember, these were first-year and first-month CSD readers surveyed as they renewed their subscriptions and that first month group consisted of the original 'Pioneers' who attended the initial Oklahoma City kick-off show.
- 4) Of those who did not have terminals operational, 86.5% reported that they intended to have an operational terminal before the next year.

**Houston.** The weather was bitter cold; unseasonably so. There were 22 operating TVRO dishes in the parking lot and more than 800 people registered. All the records were broken. HBO and other program suppliers had begun to write letters to sellers of TVRO equipment; firms such as H and R reported receiving letters warning them to stop selling equipment.

**Motor drives started here.** H and R unveiled a drive system with a simplistic east and west switch. A Tulsa, Oklahoma firm, Home Satellite Television Systems (later to call itself Satfinder Systems) did that one better; a touchtone keyboard entry pad which 'remembered' the location of each satellite in the sky. The user simply punched in the access code of the satellite and the memory unit plus drive did the rest.

KLM was on hand with the first production model Sky-Eye I single conversion receivers most had seen. CSD reported "... the Sky Eye receiver works well enough to further complicate the decision making process for the dealer. Their two-piece receiver places much of the electronics at the antenna and there are production capabilities of 300 per month ...".

DEXCEL let the cat out of the bag in Houston; they were planning to introduce another new concept in receivers 'after the first of the year,' a combination LNA plus downconverter (we would end up calling it an LNC when it came). A new show-game got started in Houston. First you waited until the exhibit hall was closed. Then you quietly went around and rounded up one-each



SATFINDER inside control box gave the user keyboard control over all the satellite positions. This was 'the first' truly automated, memory driven, dish moving system.

receiver from the apparent top performer booths at the show. Then you connected those selected to a single antenna (using power dividers) and compared the performance side-by-side. That was done in Houston and from this 'non-scientific test' CSD reported:

**"Andy Hatfield's AVCOM units, Clyde Washburn's units and Robert Coleman's new discriminator units were top performers."**

The same testing also revealed that if you did a side by side comparison between the best of the home style receivers and the best of the big dollar (still) commercial receivers, the home style receivers ALWAYS won in the sensitivity department. Nobody was 'measuring' picture 'quality' at the time.

H and R, riding high as 'the distributor/OEM' of that era broke all tradition and took two side by side booths at the trade show; nobody previously had taken more than one. They also set another apparent new record, writing more than \$500,000 in hard orders (defined as orders paid for, or with deposits) on the floor of the show. The numbers were getting bigger and bigger.

Houston was also the first show where the industry's first 'Super Distributor' appeared; **National Microtech**, coming out of rural Mississippi, had packaged a number of receiver systems and was taking the bulk of the KLM Sky Eye I output each month. National was carving new ground in distributor/dealer relationships, although at the time their approach seemed only slightly modified from that being used by H and R.

1981 dawned bright and clear. The first legislative test had been met, the year ended on an upbeat show, prices were coming down rapidly, and with innovations such as the Sky Eye I receiver, deliveries were improving. Somebody had even figured out motor drive systems!

The January 1981 issue of CSD started a tradition that continues to this day. We selected the 'Industry Man Of The Year'. It was no contest; **Henry Taylor Howard**.



# Success...

*It takes more than just great products.*



At Satellite Earth Stations, we supply our dealers with nothing but the best in satellite receiving equipment. Not to mention our own custom equipment and plenty of brand name accessories. But, a great product line is only the beginning.

## ***It takes Quality Service.***

As important as any fine product is the service behind it. For us, that means fast delivery, dependable professional maintenance and quick attention to your individual needs.

## ***Competitive Pricing.***

As a leader in the industry we have to be competitive in pricing and with volume such as ours, it's easy to do.

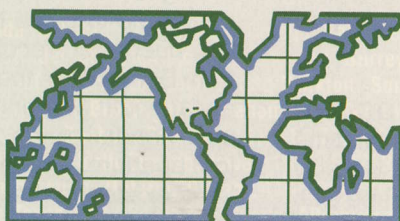
## ***And a commitment to the future.***

Success demands more than a great line of products. At Satellite Earth Stations, we're committed to the future. In fact, we even have a school for our dealers. To keep you aware of everything from fundamentals to new developments in the industry.

## ***Satellite Earth Stations***

When you need us, we'll be here.

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### **d.b.a. Satellite Earth Stations**

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Industry Lane, Covington, LA 70433  
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### **Satellite Earth Stations of Georgia, Inc.**

2039 Oglesby Pl., Macon, GA 31206

OPENING SEPT. 1, 1984



CSD wrote of the Howard selection:

**"Taylor's unselfish devotion to 'the cause' was apparent from the very first SPTS. He, Robert Coleman, H. Paul Shuch and others willingly appeared on the SPTS program and made themselves available unselfishly to the hundreds of attendees who came to learn from 'the masters'."**

On Taylor's technical contributions, CSD wrote:

**"Most of the commercial receivers now available in this field have some or a great deal of Tay Howard design work buried in their circuit boards."**

**Pricing?** They WERE going down, but only at the 'bit and piece' level. Complete systems were still quite expensive. Some examples from CSD advertising for February of 1981:

- 1) 10' system without a polar mount (ie. fixed mount) . . . **\$3,695.**
- 2) Same system with a polar mount (no motor drive) . . . **\$3,995.**
- 3) 13' system with polar mount . . . **\$4,295.**

Offshore, we were starting to hear from people who lived in far-away places. Yes, home TVRO was a worldwide growth industry. From Australia, we heard that a 13 foot dish with medium grade electronics was producing pictures from Intelsat; but the quality was barely adequate to tell what was happening on the screen. From Colombia, South America, we learned that a homebrew 28 foot dish was bringing in D3 signals only. The builder was happy to have one US TV channel, but he wanted more . . .

Early in 1981, another new trend began; movies for 'adults'. **Private Screenings** was first, coming up on transponder 5 of Westar III Friday and Saturday nights for three hours (with a three hour repeat for the west coast). With cable firms locked up on F1, the Westar 3 coverage was doomed from the start; virtually no cable firms had two (or more) dishes at the time.

The FCC got into our act with an announcement that future 4 GHz satellites would probably be spaced at 3 degree increments (4 degrees was standard at the time). There was a flurry of concern that smaller dishes (anything under 13 feet in diameter, with a suitable feed) might not be able to properly separate satellites as close together as 3 degrees. Taylor Howard and others took the position that everything would be fine with dishes ten feet and up, and Microdyne's **David Alvarez** penned an analysis published in the March 1981 issue which seemed to verify the Howard statements. For now, this worry was not pressing.

The next SPTS was to be in Washington, DC. This was not an easy decision. SPACE's Brown felt the time had come for the industry to adopt a higher visibility level. He was concerned, after the narrow escape with HR 7747 the prior fall, that new legislation might be introduced into Congress in 1981. The industry, or Brown, had beaten the anti-TVRO legislation through a



**NELSON ETHIER** (right) wrote a manual that described the self-construction of a modestly high-quality fiberglass dish antenna in this period. Hundreds of antennas were built following Nelson's manual-plans and not a few firms went into business using the Ethier manual as a set of blue-prints!

combination of skills and some luck; the next time, he said, "We need to be prepared". One way to be prepared was to have some 'friends in Congress who knew what we were doing and what we stood for.'

The speaker line-up was unlike any prior industry event; including Congressmen Charles Rose (NC) and Billy Tauzin (Louisiana), FCC Commissioner James Quello and from the Motion Picture Association of America (MPAA), Fritz Attaway. Brown said this showed the industry was growing up and attracting 'official' interest. Not everyone agreed that we were 'ready' for official interest, however.

CSD wrote:

**"(Official attention) is coming. That is why Washington, DC is the right place to be this spring. Senator Barry Goldwater has been asked to join us and to tour our exhibit hall to see for himself just how impressive this young industry has become and what an important part it now plays in international microwave technology . . ."**

**CSD for April 1981** published the first set of 'satellite coverage maps' ever created for the Caribbean and northern South America. Between the sketchy data available from the satellite operators, and the considerable data coming in from CSD readers scattered throughout the region, AB Electronics' Bob Behar had been able to piece together what size antenna he felt you needed to receive various US domestic satellites from Barbados in the east to Costa Rica in the west, and as far south as Venezuela and Colombia. Backing this up, a handful of firms were now shipping 'home style' 20 foot aperture antennas and perhaps 25 to 40 such systems existed in the deep fringe areas surrounding the continental US region.

Some of what the home TVRO design engineers were doing was beginning to rub off, backwards, on the

Airpatch Avio  
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Satellite Cedarburg, Wisconsin 414-375-1000 Halvorson Distributing Yankton, South Dakota 605-665-1240 K & M Resources  
Mathis, Texas 512-547-3278 Long's Electronics Birmingham, Alabama 1-800-633-4984 National Micro-Dynamics Chattanooga,  
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California 209-464-5870 Transvision Corporation Greenbrae, California 415-924-6963 Video Electronics Louisville, Kentucky  
502-969-1810 Video Signals Wallisville, Texas 409-389-2214



commercial suppliers. **Comtech**, an Arizona firm that had entered the commercial game 'late' had also been attempting to sell a (high) quality product in the home field as well. Their April 1981 advertisement began:

**"See Comtech's NEW Antenna Mounted Receiver At Coop's Show In Washington."**

Their new receiver was patterned after a Robert Coleman/Starview (H and R) package originally shown privately in San Jose and then formally unveiled at the Houston show. With one 'twist,' they had built in automatic polarization switching. That meant that when the viewer changed channels, he was also changing the polarization on the antenna. THAT was new! How did **they** do it? History forgets but by the summer of 81 show in Omaha, several people would have that problem figured out.

Another problem in receiver design was also apparent. Single conversion receivers, pioneered by Barker and KLM, had a undesirable side effect all their own. It was called 'LO leakage.'

A single conversion receiver was a form of miniature transmitter. In the process of making satellite pictures appear on the screen, a signal was created. That signal was harmless provided you didn't get two TVRO receivers too close together. The Washington trade show had lots of receivers in a very confined area. The interference between receivers and antennas reached intolerable levels (a problem that had been first noticed in Houston where the first of the single conversion units were displayed). Andy Hatfield of AVCOM, and others, had an answer but it was not an inexpensive answer; special 'isolator' devices had to be installed between the TVRO receiver and the antenna to keep the miniature transmitter's signal, from each receiver, from going backwards 'out the antenna' to interfere with other near-by antenna systems.

The distributors were coming in in force. A few of the names you will recognize today. Others have come, and gone, or at least changed their names. Included in the advertising pages during the spring of 1981 we had:

- 1) Starview Systems (Pocahontas, Arkansas)
- 2) Advanced Electronics (Las Vegas, Nevada)
- 3) Satellite Video Systems (Cabot, Arkansas)
- 4) Wilson Microwave Systems, Inc. (Las Vegas, Nevada)
- 5) Satelco (Los Angeles, California)
- 6) Earthstar Corporation (South Holland, Illinois)
- 7) Star Trak Systems, Inc. (Colorado Springs, Colorado)
- 8) National Microtech, Inc. (Grenada, Mississippi)
- 9) Delstar Systems (Houston, Texas)
- 10) Satellite Technology Services, Inc. (St. Louis, Missouri)
- 11) Mid America Video (North Little Rock, Arkansas)
- 12) Satellite Antenna Company (Las Vegas, Nevada)
- 13) Channel One, Inc. (Lincoln, Massachusetts)
- 14) Southwestern Satellite Systems (Albuquerque,

New Mexico)

How many are still in business today, under the same names? Not very many!

Washington was the biggest show yet; the trend continued. The official tally said that 1200 people registered and there were 80 equipment booths. The superstars were there; all of those earlier cited plus **Ralph Nader** who encouraged the attendees to continue to 'tweek the nose of the communications establishment to get what you want and what all Americans want.'

Congressman Charlie Rose brought the house down, in an era where the industry suspected there was an HBO 'agent' hiding behind every tree and dish. Rose told the audience:

**"Nobody is going to come into my house and tell me what I can watch!"**

In the equipment area, Dexcel made good on their promise to show off an LNC unit but they had to share the limelight with KLM which also showed a packaged at-feed system (LNA plus downconverter). **ICM** displayed a dual conversion system with their downconverter also at the antenna. The Dexcel approach was the most elegant simply because they had married the low noise amplifier and the downconverter into a single integrated package. Their (LNC) unit would be many months before it arrived in dealer hands, but it was the direction that many system designers would point in years ahead.

One show attendee, a young man who would pop up quite often in the years to come, posted a sign. This was his first satellite show 'ever.' The sign read:

**"\$100 REWARD/ To the First Exhibitor To Display Russian Ghorizont Reception!"**

He paid his \$100 to Hero's Bob Behar after Bob moved his 16 foot antenna to the east and scooting between a pair of buildings, managed to pull in the far eastern signal. **Comm-Plus** came in second, but actually had a superior signal on their 12 foot proto-type screen mesh surface designed by a fellow named Nelson Ethier. The guy paying the \$100? **Kenny Schaffer** of New York City.

There was a returning pioneer in Washington. **Rod Wheeler**, the man who actually installed the first (or one of the two first) TVROs in a private residence in North America was back with a pair of new **Norsat** receivers. Wheeler had a line of dual conversion, high grade receivers which he was building in Canada. The next time we would hear from Wheeler would be with Norsat LNAs; some years down the road.

Between the April SPTS show and the next one, coming up in Omaha there were a handful of significant events. Not necessarily in order of historical priority, they included:

- 1) **Channel Master** held a major event in Atlanta and introduced their own line of TVRO hardware. Channel Master began with ten and twelve foot antennas packaged with 120 and 100 degree



# So... You want to watch "Friends Of Attila The Hun" ... We're not sure why.

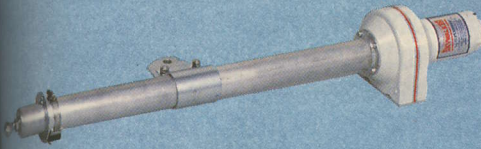
But if you really do, it can't be any easier than with our Skywalker II programmable antenna control system.

Your program guide says F4. Depress the Select button until the scanning light stops at F4. That's it. ONE BUTTON. You don't even have to know that F4 is a SATCOM satellite - or remember that D4 is a COMSTAR. 16 positions available, 10 for the video birds now up, and 6 for new launches. It takes only seconds to program - right on the face of your console - by anyone in your family. EASY!

The Skywalker II system comes with our powerful and safe 24 volt D.C. actuator; field proven in over 550,000 actuator and winch installations. The handsome control console looks like it belongs with your other video components.

**AND** - if you want to stop someone from watching "Friends Of Attila The Hun", you can do that, too, with our lock-out feature.

**NOW THAT  
MAKES SENSE!**



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By **SUPERWINCH**

Antenna Drive and  
Control Systems

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Skywalker™ antenna drive and control systems.

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City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
Dept. \_\_\_\_\_

23 W5 To Be Announced  
24 AB Varied Programs  
25 AD1 (S) News  
26 AD1 (S) Le Monde  
27 AD1 (S) Mark & Mindy  
28 AD1 (S) Don Norman Show  
29 AD1 Adjournment Debate

ENTERTAINMENT

30 F3 MOVIE: 'A Little Sex'  
31 F3 Little House on the Prairie  
32 F3 New Treasure Hunt  
33 F3 USA Cartoon Express  
34 F3 Video Music with Martha Quinn  
35 F3 MOVIE: 'Gang's All Here' A fun-loving young man, posing as a 'lonely soldier', must choose between a rich girl and a beautiful singer, Carmen Miranda.  
36 F3 Mommy, Daddy and Me  
37 F3 Nat. Press Club or Policy Speech  
38 F3 MOVIE: 'Fur' (USA)

EVENING

39 F4 MOVIE: 'Friends Of Attila The Hun' An over-the-hill freedom fighter finances his dream restaurant by terrorizing his friends with water bombs. 1929. Rated T.  
6:00P-6:30P 4:00P-4:30P

40 G1 Mundo Latina Jesse Losada y Sonia Vorhauer son los anfitriones de este programa de asuntos publicos nacionales presentando entrevistas, noticias, deportes y un segmento desde Hollywood  
41 F3 Circle Square  
42 F3 One Day at a Time  
43 D4 Video Country Music  
44 W5 Buck Rogers  
45 W5 News Update  
46 W5 SPOT Magazine  
47 W5 Opryland on Stage





**After a satellite signal travels 22,300 miles, it's the last few hundred feet that make the difference—because the system makes the picture... and M/A-COM makes the system.**

When you buy a satellite antenna system you expect a stable, clear picture with no-hassle tuning and adjustments. You get that with the M/A-COM system.

You get a better picture because the M/A-COM system is a system, not an unrelated collection of devices. And each part of the system is designed to do its job well—from the reflector to the receiver.

Here's what you'll find in the M/A-COM system:

*The Reflector*—Perfectly shaped and thermally compression molded to hold a true parabolic shape.

*The Omni Polarizer*—One of two M/A-COM approaches to polarity switching. The 100% solid state polarizer offers instant electronic polarity without tweaking.

switch,  
and a se

easy to  
reflectors.

The



Look





**The Omni Rotor**—If you want a mechanical polarity switch, M/A-COM has that, too. The rotor has an in-line design with a sealed, weatherproof housing.

**The Prodelin Mount**—A true polar mount, easy to install, easy to adjust. It interfaces with Prodelin 8 ft. and 10 ft. rotors.

**The Receivers**—A choice of the M/A-COM T-1 or H-1 full featured receivers with microprocessor controlled tuning, wireless remote control and parental supervision lockout feature.

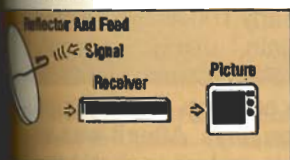
part has features and advantages that make it a valuable buy on its own. And connected with all of the other parts of the system, it's even better.

Make sure you get the picture you want. Buy M/A-COM. **M/A-COM Cable Home Group, Satellite Antenna Systems,** Post Office Box 1729, Hickory, NC 28603 800/438-3331 704/324-2200 Telex: 802-166

**M/A-COM**

**CABLE HOME GROUP**

*The system makes the picture. M/A-COM makes the system.*



Look into the M/A-COM system. You'll find that every



YEAR TWO/ continued from page 113

LNAs. Their sales thrust was through their established distributors for their terrestrial TV products line. They were the first of the major-name TV suppliers to enter our industry.

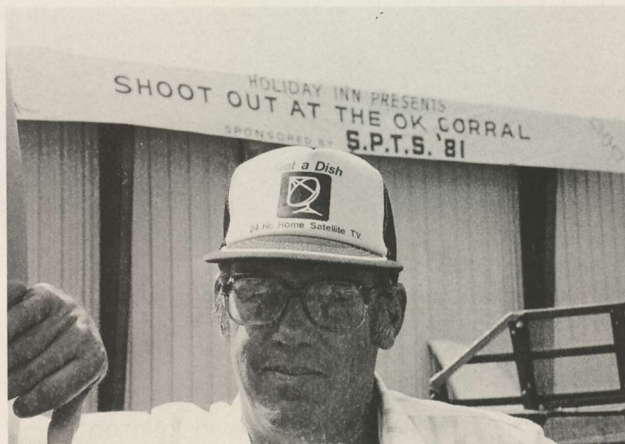
- 2) National Microtech got into the antenna business when **Dave Fedric** went out into the warehouse one day and noticed his crews were having trouble stuffing ten foot round parabolic fiberglass antennas into 8 foot wide trailers. He picked up a skill saw and whacked the corners off the round antenna creating a 9 foot more or less square antenna. They called it 'The Birth Of A Legend.' Now you know how that legend was REALLY born!
- 3) **SHOWTIME** was the first of the premium program suppliers to expand to a 24 hour day (late June, 1981). HBO began their 24 hour per day service January 1, 1982.
- 4) **Industrial Scientific, Inc.**, one of the 'here today and gone tomorrow' name-changing Las Vegas TVRO supply firms, announced a 13 foot screen mesh dish antenna system with a motor drive for \$2495 retail. They called it 'The Northstar' and when last seen, that was apparently where it was headed.
- 5) **Satellite Supplies Inc.** introduced a new TVRO receiver they called 'The Entertainer.' Their advertising claimed it was designed by Tay Howard and they said they would have a total of 5,000 receiver units available 'to ship during 1981.' Somehow, fewer than that were actually shipped.
- 6) **Hastings Antenna Company** ('One of America's oldest and largest metal fabricators') entered the TVRO antenna business with a 12 foot polar mounted aluminum and steel antenna system; price was \$1395.
- 7) **SPACEAGE Electronics** offered the first motorized jack antenna retrofit kit. For \$236 you could change a dish from a fixed polar mount to a motor driven polar mount. No control box was supplied ("Simple instructions included for 2-switch control installation . . .").

**Omaha.** August 14-15-16.

'Back To Basics' was the theme of the show, reflecting the unrest created by the Washington (DC) 'politically flavored' program in April. New dealers were far more interested in touching and experimenting and comparing than they were in sitting in chairs and listening to politicians. Omaha would try to reflect that.

For one firm, with great promise, Omaha was a disaster. It went like this.

**SatFinder Systems** had bounced into the industry with the industry's first computer-memory motorized tracking system. That had been in Houston the previous November. By the Washington, DC show, SatFinder was the firm to 'beat.' Their ten foot dish systems, pack-



**GREAT ANTENNA SHOOT OUT/** at the Omaha SPTS, pitted antenna against antenna. This was one of the most popular features ever staged at an industry trade show.

aged with AVCOM receivers, were going to dealers at about twice the price dealers pay today for similar function systems. SatFinder had a proprietary dish and a proprietary drive. They wanted an unusual, proprietary receiver.

Up in South Dakota, a man named **Keith Anderson** had created a very unique type of receiver; he downconverted the full 3.7 to 4.2 GHz band down to the UHF (TV) region; 430 to 930 MHz or so. Then he had a very unusual demodulator built around a common Japanese TV tuner. The tuner extracted the single satellite TV signal from the 430-930 MHz IF, turned it into video, and displayed it on a VHF TV channel on the TV set. A variation of this went from the UHF IF directly to a UHF TV channel **without** any demodulator or remodulator.

SatFinder agreed to buy the rights to the system. They wanted to set up a manufacturing facility for the new (SCDN) receivers in Tulsa. They even flew England's **Steve Birkill** to the United States to head it up.

When the package of equipment arrived in Omaha, where it was certain to take the industry by storm, it failed to work properly. SatFinder never recovered and by the 'next' show, in Anaheim in the fall, SatFinder would barely remain in business. The SatFinder/SCDN 'failure' would be a warning to others who had 'startling new technology;' many learned a painful lesson from the experience.

Omaha did several positive things. Things that had never been done before. First there were the antenna tests; they called it '**The Great Omaha Antenna Shoot Out.**'

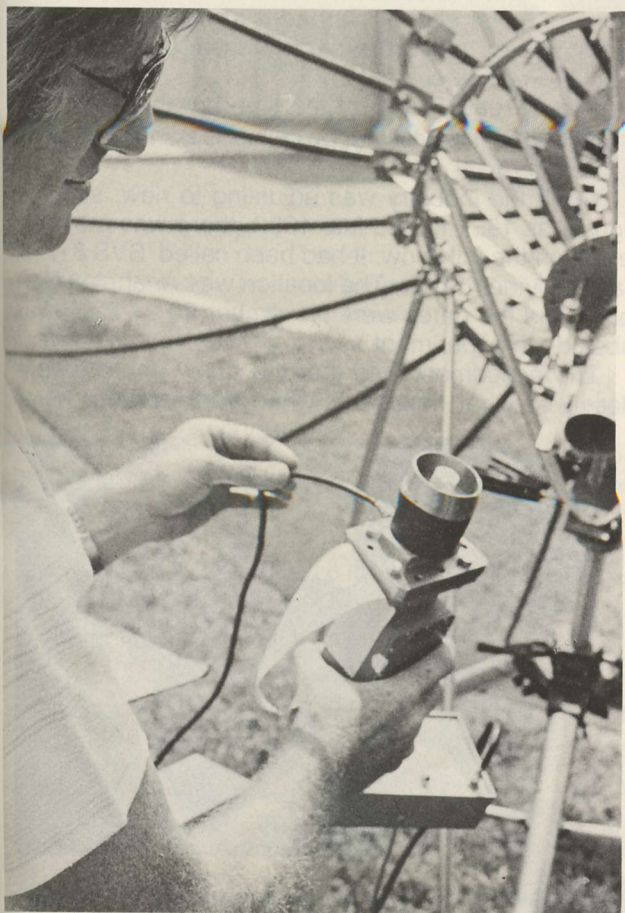
A couple of microwave engineers from California (Jack Trollman, Mike Gustafson) contracted to conduct antenna measurements. The concept was that any antenna on the lot (there were nearly 100 all told!) would and could be measured for 'gain,' using the kindly supplied HBO signal on TR24 of F1. Trollman and Gustafson spent an hour or more per antenna, and whipped through nearly two dozen in three days. After it was all over, they 'graded' the antennas and announced the



results in a closing seminar forum. The actual antennas were NOT matched to the gain figures, except privately to the builders of the antennas. But it didn't take long for the word to spread. Some of the well known antennas, such as ADM, were 'best of (size) class' and within hours most everyone knew who did what and how well.

The intended purpose of the tests was to help the antenna designers/manufacturers have a better feel for how well THEIR products stacked up against the products of competitors in the same size class. Each had to agree NOT to use the results in advertising.

**Paraclipse**, or Paradigm Manufacturing, Inc., was there with their proto-type screen mesh; not dissimilar to the antenna we now all instantly recognize. It did poorly. So poorly that Paraclipse's David Johnson 'gave away' the proto-type he had hauled to Omaha from Redding, California. He had discussed his antenna's failings with Taylor Howard and others and he now understood what he had to do to build a commercial product. Wisely, he would not enter the real marketplace until he had corrected those mistakes. And THAT is what the Omaha antenna tests were REALLY all about; the industry helping its own 'novices' (and pros) get a better handle on where they were. It was one of the



**NO MOVING PARTS/** Bob Luly demonstrates his Ferrite Rotation system at Omaha. In background, 1981 version of his Luly Screen Mesh, collapsible Umbrella antenna.

last (rare) examples of a totally friendly, totally helpful industry at work.

Omaha also saw the introduction of two new polarization rotation schemes. **Bob Luly** introduced a signal polarity switching system with no moving parts; he used a 'ferrite' material to rotate the satellite signals electronically inside the feed. It was a winner, but would be slow to get into production. A Florida manufacturer, headed up by one **Gene Augustin**, introduced a small selsyn/motor driven rotating probe assembly which allowed the user to switch from vertical to horizontal (or vice versa) with an indoor toggle switch. Within six months, many receivers would have such an interface built into the receivers proper and within 12 months many receivers would 'toggle' the feed from one polarization to another when the consumer tuned the receiver from one channel to another; all automatically. The day of the TV antenna rotor polarization switching system was virtually over!

The single conversion 'blahs,' the result of too many single conversion receivers (without isolators) crammed into too tight a spot, got some close scrutiny in Omaha. A crew, led by Californian **Steve Gibson**, stole out into the antenna-parking-lot in the dead of night and they wandered around with a test antenna and a signal receiving device called a Spectrum Analyzer. With this equipment, they located and recorded all of the receive antennas that were 'transmitting' interference to other nearby (and not so nearby!) antennas. The industry was finally coming to grips with a technical problem that made life difficult at shows.

Our second year as an industry was drawing to a close when **The Heath Company** brought out their fall catalog. There, on page 10, was an announcement: Heath was in the Home TVRO Business!

Well, almost.

Heath had decided, after starting their quest back at the Miami SPTS in the winter of 1980, to offer a Scientific-Atlanta TVRO package system. It was not inexpensive (\$6995 for their 'basic' system) and it was already behind times when it was introduced.

The final issue of Year Two, for CSD, also reported that Cuba had begun to use the Russian G(h)orizont satellite to transmit internal Cuban television to various other island countries in the Caribbean, as well as to Cuban troops stationed in Africa and Central America. Some eyebrows were raised.

Other eyebrows were raised as the first anti-TVRO campaign, funded by a combination of broadcast and movie interests, began sending out press kits to newspapers. One, in Midland, Texas reported that 'civil lawsuits' were being filed against anyone who owned and used a home TVRO. There was no truth to the lawsuit story but it was certainly clear that somebody, someplace, was deliberately setting out to upset the industry's growing marketplace.

**Ahead?** Year three, and the Anaheim, California show in November.



## YEAR THREE/

## WELL, MAYBE 'THIS' WOULD BE THE YEAR!

### WHEN In Doubt/Punt . . .

There was plenty to be excited about, coming out of the Omaha show. Most of all, there was a brand new cable TV satellite promised. It was about two years behind schedule.

RCA, way back in 1978, had promised the cable industry that after moving to F1 (at 135 west), RCA would implement and speed up plans to launch a new 24 channel satellite (F3). Their target date was December of 1979. By early in 1979, RCA sales types were on the street 'selling transponder space' in the F3/F1 duo. RCA envisioned that two cable satellites, spaced at (initially) 135 and 132 degrees (later 135 and 131) would give the cable industry perhaps 40 transponders to 'grow to.' Only the F3 satellite failed to achieve Clarke Orbit and disappeared from view (and ground control) in a tricky maneuver that left the guys on the ground wondering what happened.

**When F3 was lost**, RCA sped up the normal three year replacement process and was now scheduling an 'R' (replacement) launch for December of 1981. The bird would be known as F3R.

CSD for October 1981 outlined what to expect and the change over sequence anticipated. This was not the first time that cable had 'moved'; the F2 to F1 move, back on May 30, 1978 had been the first. Only this time the 'terminal universe' in cable and other users of F1/F3R was appreciably larger. And the changeover was to take place in December; some northern terminals could be expected to have some 'weather problems.'

What excited private terminal folks the most was the announcement by RCA that at least six of the 24 transponders on board F3R would be 8.5 watts; an increase of 3.5 watts from the best of the F1 transponders. More power in the sky meant more signal on the ground. In a nutshell, better pictures with small(er) dishes.

There was some (RCA created) mystery about which transponders would be 8.5 watt; it would ultimately turn out to be 3 (WGN), 7 (ESPN), 11 (MTV), 15 (CNN-2), 19 (C-SPAN) and 23 (Cinemax east). The selection seemed so mixed that it was finally obvious that RCA had not 'loaded' it in favor of any particular customer nor group of customers; it was simply the way it worked out.

The launch and switchover to F3R would be near textbook. And instantly private terminal folks knew they **LIKED** what they were seeing. There was a very obvious difference in signal level, in most of the country, in favor of the 8.5 watt transponders. In fact, within months, people with very small dishes (5 and 6 and 7 foot in diameter) were reporting 'noise free' pictures on at least the 8.5 watt transponders. Further out, terminal operators as far east as Barbados and as far south as Colombia were getting the 'same message'; the 8.5 watt channels were spectacular!

Nobody really saw it at the time but the seeds for something that would later be called 'C Band DBS' were planted here.

While the industry was adjusting to new, stronger signals as 1981 turned into 1982, there was a time to reflect on the fall show. It had been called 'SVS 81,' for Satellite Video Show. The location was Anaheim, California and the dates were November 20-21-22. It was labeled 'an experiment.'

The experiment was that the show dared to look closely at what happened when you took our home

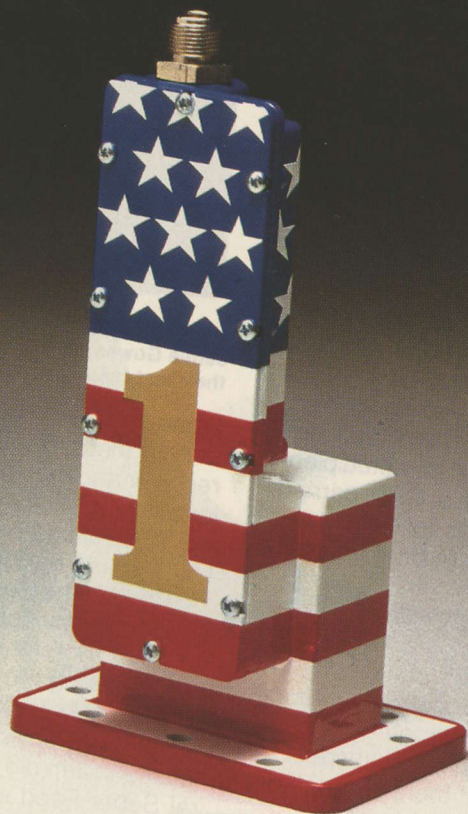


**THE DUSHANE BROTHERS/** put Janeil on the map in 1982 after a false start at the Anaheim show late in 1981. Their screen mesh antennas and ultimately their receivers would teach us some new marketing tricks. Bob (left) has been a member of the SPACE Board for two years.



# NUMBER 1

## For a Lot of Good Reasons



When you ask for an Avantek LNA, you're asking for quality, reliability and long-term customer satisfaction. As a pioneer in the industry, Avantek has set the standard for LNA performance.

That fragile satellite signal needs very careful handling on the way to your customer's receiver. You can't get any more out of a picture than what you start with. An Avantek LNA at the antenna assures your customer of the finest quality reception possible. And it guarantees you peace of mind.

Consider:

- Avantek builds all of its own GaAs FET transistors for complete control of quality and delivery.
- Avantek LNAs have a wide range of noise figure selection to match the application.

- Avantek LNAs are lightweight to reduce mounting stress.
- Avantek LNAs meet or exceed specifications. ALWAYS.

Call the authorized Avantek distributor nearest you. Ask for an Avantek LNA by name. You'll be buying a lot of confidence.

### Avantek LNA Distributors:

#### Alabama

Longs Electronics  
(800) 633-6461  
(800) 633-3410

#### California

Echosphere Corp.  
(916) 381-5084  
(800) 338-5477  
(800) 338-5478 (CA)

#### Colorado

Echosphere Corp.  
(303) 935-1909  
(800) 521-9282

#### Florida

Southeast Sat. Dist.  
(904) 824-1915  
829-5434  
(800) 824-3474

#### National Sat. Comm.

(305) 851-4738  
(800) 821-8659

#### Georgia

Kelgo Intl.  
(800) 241-8189  
(800) 282-6070 (GA)

#### Indiana

Hoosier Electronics  
(812) 238-1456  
(800) 457-3330

#### Kentucky

Starpath Sys.  
(606) 276-4435  
(502) 343-3898

#### New York

National Sat. Comm.  
(518) 383-2211  
(800) 833-4485

#### Pennsylvania

Kelgo North  
(412) 787-2770

#### South Carolina

Quarles Sat. Sys.  
(803) 229-7990  
(800) 845-6952  
(800) 922-9704 (SC)

#### Tennessee

Echosphere East  
(615) 966-4114  
(800) 223-1507



# Avantek

Milpitas, California

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satellite signals and stuck them onto big, projection TV set screens. Somebody had decided that we were in the 'high quality television business' and naturally high quality meant 'big.' Well, that's what we said.

The show was arranged so that there should have been plenty of use of 'video'; videotaping of seminar sessions, big screen projection sets throughout the exhibit hall so people could wander the exhibits AND stop and take in the seminar sessions (on the screen) as they wished. Only there were technical difficulties and the show ended up being a showplace for the first real price war the industry had seen.

**Boman Industries.** A firm now familiar to most of the industry first displayed at Anaheim. Bob Maniaci, Boman's spokesman, recalls "We may not have been totally ready for the industry but we wanted to make an impression . . .". They did. They offered a ten foot fiberglass antenna, or a 110 degree LNA, or a TVRO receiver; your choice, \$399 each. Or, you could have bought the basic package (less mount and feed and cables and modulator) for \$995. And that attracted plenty of attention since the same month's CSD carried distributor ads for complete systems as follows:

- 1) Starview Systems 10R system (a do it yourself semi-kit) for **\$2400**;
- 2) Via-Sat 10 foot dish with 120 LNA and receiver for **\$2895**,

and THESE were the LOW END prices of that period. Maniaci would later comment "Dealers love us because we brought prices down; we forced the others to reduce their profit margins." As you might suspect, if the dealers did indeed 'love Boman,' there were other distributors and OEMs who had different feelings.

Numbers got widely and wildly tossed about in Anaheim. The industry was trying to piece together just how BIG it was. After much head scratching, CSD would publish in January of 1982 a set of tables which suggested that TVRO terminal growth, from January of 1981 to December of 1982 had been someplace between 350 terminals per month (January) and 2,400 per month (December). The plot and graph showed a relatively slow growth to the 1,300 per month region in August followed by an end-of-year spurt that nearly doubled the per month total by December.

Looking back, a year or so later, it would turn out that the industry apparently never reached a REAL 2,000 terminals per month, total, during 1981. The numbers were pressing at the time because LNA suppliers were concerned that the fall-of-81 shortage in their product area NOT occur again.

There were other concerns; **would anyone** be using LNAs in the fall of 1982? Several people were looking at the now-being-shipped Dexcel LNC package (they still hadn't decided what to call it; distributor ads referred to it as an LNA plus downconverter) as the precursor of a rapid shift away from stand-alone LNAs. Others were not so sure.

The stand alone LNAs allowed the dealers to mix and match system components; one brand LNA, one



**HAWAII REPORT/** Guy Davis, then with National Microtech, Jamie Gowen of ADM and Andy Hatfield of AVCOM reported on their test results in Hawaii with an ADM 11 footer.

brand receiver. The LNC approach made it impossible to split the system up; the LNC had to mate with the receiver and that meant the dealer was no longer free to innovate with receiver installations. It could go either way. But ultimately it would turn out that stand alone LNAs would not die out, as some predicted.

Pricing, the Boman entry aside, WAS coming down. In all areas except perhaps the 'name brand' receivers. National Microtech had reduced their antenna lift package (antenna mover and controller) to \$495. And 120 degree LNAs were down to \$499 (International Satellite Systems). Copycat products were also showing up; at least one firm did a copy of the already popular Chaparral Super Feed and offered it for pricing between \$59 (singles) and \$35 (100 lot).

Some of the names we are now more familiar with were showing up by late in 1981 and the first two months of 1982. For example, High Frontier, ATV Research, Quantum Associates, Earth Terminals, Hoosier Electronics, Arunta (Engineering Co.), Newton Electronics, R.L. Drake (announcing their ESR24 receiver), National Satellite Communications, and Satellite TV Week.

**Dave Fedric**, one of the three leaders at National Microtech. He was named CSD's 'Industry Man Of The Year' in our January, 1982 issue. The choice surprised some who were perhaps out of touch with the industry's rapid changes. It was, during 1981, that the importance of the distributor as an important segment of the market developed. Prior to National Microtech, and the other early distributors, the OEMs sold directly to the dealers; or even the end users. Equipment moved erratically; OEMs had money to enlarge and expand when retail sales were good. When the season was slow, as it has always been for at least seven months of each year, everything slowed down or stopped. The stocking distributor changed this; if not totally, substantially. Now equipment moved from OEM out the door with greater regularity. The cash flow cycles leveled off and that put a better working situation into the hands of the OEMs.

In addition to establishing the largest national dis-



# Make It Easy On Yourself...

Delta now introduces the easy way to buy satellite systems. We call it "Total System Packaging." Delta has taken the time and expense out of testing which satellite components work best together.

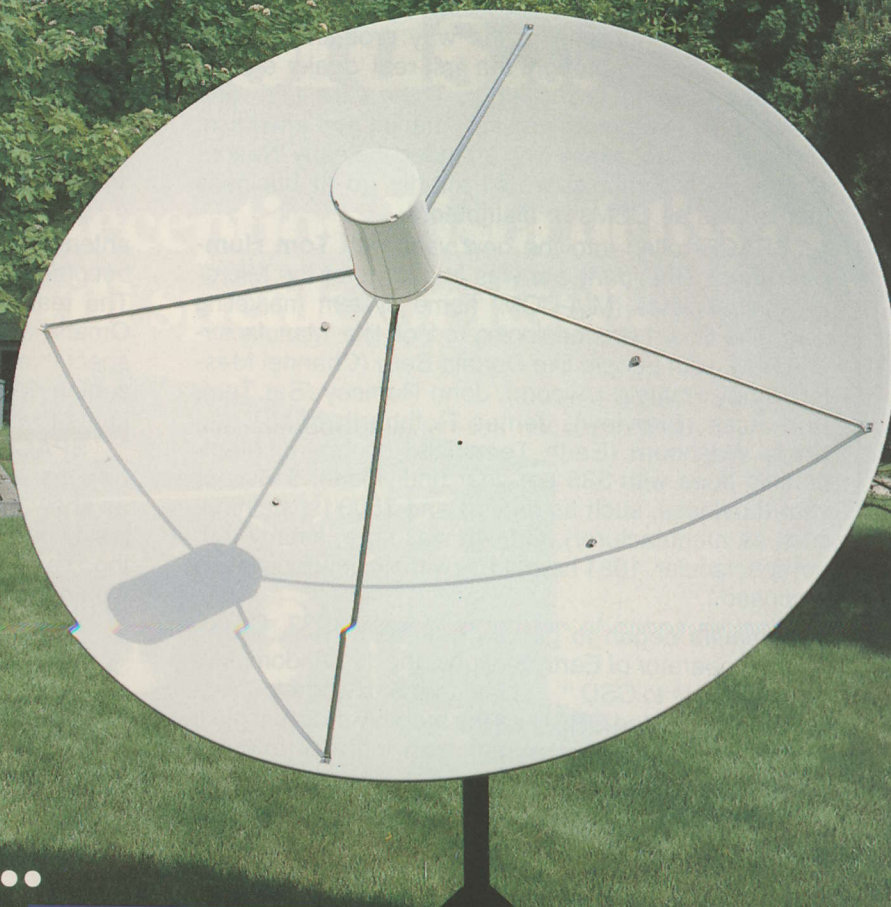
We have found that the best selling, most accurate dishes available use a one piece design. That is why we chose to build the Starduster. It is spun from lightweight aircraft type aluminum and its smooth satin finish will deliver crystal clear reception. All electronic components have been tested with the Starduster to assure maximum performance.

Here's how simple it is to get started. Call toll free today and ask for a Delta Select-A-System Chart. It's that easy.

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tributorship, and changing the way products moved, Fedric's crew also brought the first real 'dealer education' programs to the dealers. They were told, and shown, how to promote and sell, market and advertise, install and collect. Many who attended the early 'National Microtech Schools' would shortly go in business themselves as OEMs or distributors.

SPACE rolled into the new year with **Tom Humpheries** as President. He was in charge of the Microwave Associates (M/A-COM) home system marketing plan. The Board was beginning to look like 'Manufacturer's Row' with people like Donald Berg (Channel Master), Andy Hatfield (Avcom), John Ramsey (Sat Tec), Bud Ross (Birdview), James Rothbarth (STS) and Clyde Washburn (Earth Terminals) on board. Membership dues with \$35 per year (individual), \$150 per year (business, such as dealer) and \$500 (sustaining, such as manufacturer). Growth was sure, steady, but not spectacular. 1981 had slid by with no new legislation proposed.

Dealers began to get angry in early 1982. **Corky Byam**, operator of Earth Stations, Inc. in Windom, Minnesota wrote to CSD "... I feel that **SatGuide** (publication that preceded ORBIT as the monthly program guide for users) is more consumer than industry oriented. They allow manufacturers to spell out prices at the lowest levels and this makes it very difficult for a distributor to deal with dealers who need to sell end users. It really makes the dealer look like a bandit!". Byam's concern would be amplified and repeated often in the years ahead; dealers who found it difficult to compete with wholesale pricing (and ultimately, 800 number toll free order lines offering discounted hardware pricing) already in the hands of consumers who had found a copy of the 'program guides.' Byam won't like it, but more than two years after he complained, that problem is still not resolved!

Electronic Polarization Rotation. The end to mechanical TV rotors. They appeared in the marketplace (Chaparral) late in 1981. The order response from dealers was intense and it took Chaparral some months to catch up. And that invited competition. International Satellite Video Corporation was an early competitor with their 'Polatron'™. It advertised, in March of 1982, "No Moving Parts . . . No Motors To Fail . . . No Waiting . . .". The price for the new generation feed was \$189.95 and to that you had to add a \$44.50 controller.

**Houston Satellite Systems**, destined to become one of the 'Big Two' in TVRO motor drives and controllers, entered the national field in March of 1982. Their Tracker II unit included an 11 position switch to select any of 11 pre-programmed positions, DC voltage to drive the actuator and a 4 wire interconnection to the outdoor drive.

**Fort Worth.** March 26-27-28. And downtown Fort Worth at that!

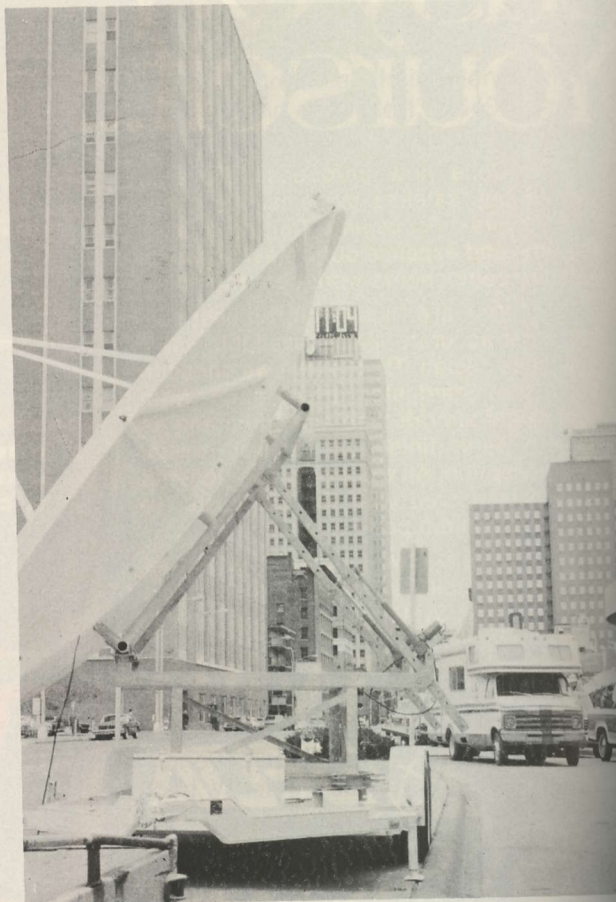
The art of locating an appropriate setting for a TVRO show was never taxed more than at Fort Worth. The

60,000 square foot Tarrant County Convention Center was about as 'downtown Fort Worth' as you could get. Towering twenty stories directly above the center was a powerful multi-directional Bell telephone microwave system, the perfect 'test' for those who claimed they had 'the solution' to terrestrial interference (TI)!

**ADM** selected this show to unveil their new 20 foot antenna. It was big and after a year of field trials, it would become one of the strong products in the ADM line-up. The team of Gustafson and Trollman repeated their Omaha antenna tests but found it difficult to do a respectable job given the physical constraints of the show setting. Measuring an antenna on the edge of a busy cross-town major street was dangerous to say the least!

**SPACE** used the Fort Worth show to announce their own first show; it would be held in Omaha August 5-6-7 as show entrepreneur Schneringer had agreed to skip his own summer session in favor of the SPACE gathering. That would be the start of a disagreement which would build and fester through the winter of 1984.

The technical innovations continued. Chaparral announced 'Dual Feed II,' a special feed that allowed the user to install a pair of LNAs (one for the horizontal signals, one for the verticals) for those commercial or



**STAYING OUT OF TRAFFIC** with dish antennas parked on the curb was a formidable challenge in 'downtown Fort Worth' in the spring of 1982.



# Our Picture's worth a thousand words...

See the Superior Reception Vista delivers and our picture will speak for itself.



Vista XR-1000  
Satellite Receiver  
With Matrix Stereo  
Vista XR-750  
Satellite Receiver

No high pressure sales pitch needed here. Just see a demonstration of a Vista Satellite Receiver and you'll be convinced. Vista delivers superior reception throughout the entire Vista product line.

Stereo? We've got it—in one neat package. Whether you need Polarotor I\* or Polarotor II\* interface, Vista has the receiver you need. State-of-the-art satellite receivers, with built-in modulators, that anyone can afford. Quality construction and engineering for excellent performance with a very unique feature... affordability. That's Vista! See a demonstration today. You'll get the picture!

\*Polarotor is a registered trademark of Chaparral Communications, Inc.



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(501) 843-6595  
Sales Department toll-free number 1-800-457-3024

Telex 820-004



# AVCOM

## Satellite receiver accessories

### NEW PRODUCT FROM AVCOM

IPD-65 Isolated Power Divider  
70dB isolation, typical!

NEW  
from  
AVCOM!



IPD-65

- Automatic Feedline Power Switching and DC Block Circuits
- LED LNA Power Indicator
- Extremely Reliable - High Performance

### Ferrite Isolators 3.7 - 4.2 GHz

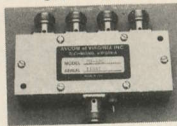


For multi-receiver installations.  
Better than 60db isolation.  
Choice of connector configuration.

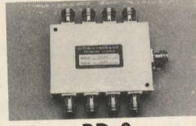
### Power Dividers 3.7 - 4.2 GHz



PD-2



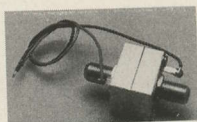
PD-4



PD-8

Available with Internal DC Block.  
Order with "DC" suffix.

### DC Blocks



DCP-66  
40 to 1500 MHz  
Insert, Remove or Block DC Power



DCP-1  
3.7 - 4.7 GHz

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AVCOM Information number: 1-804-794-2500

semi-commercial installations which required simultaneous use of both sides of the bird. KLM had moved to their Sky Eye IV model; destined to become the most popular receiver ever offered by the firm. The need to refine dish performance was evident as many of the new firms in the spring of 1982 concentrated on producing clean signals rather than smaller size antennas. **Laux Communications**, for example, was producing a 12 foot fiberglass dish in Ohio that shipped in four pieces. Their emphasis was on its 'two man installation' and how the slightly larger size would allow the installer to 'clean up the marginal signals.'

The first four-color advertisement appeared inside of CSD; **Lowrance** with their System 7 receiver in the May 1982 issue. That would start a trend in higher grade promotion within the industry that would continue to this day.

And, **Odom** antennas broke away from H and R (Starview) and Randall set up shop in Beebe, Arkansas offering one and two piece 10 footers, two piece 12 footers, three piece 16 footers and a seven piece 20 footer (!). His advertisement noted "Complete 10' Antenna Packages as low as \$1065."

The rapid proliferation of TVRO was making waves in the electronics industry. The prestigious Electronic Industries Association (EIA) entertained a proposal to take 'us' under 'their wing' in the spring of 1982. They considered setting up a separate 'sub-group' for 'Home Satellite Systems' and then abandoned the project. SPACE was not excited about the prospect.

There were two new satellites to 'play' with; Westar IV and Satcom IV. The new Westar satellite had taken over the load for the PBS services and it rapidly filled up with plenty of other broadcaster oriented programming as well. Its coverage was exciting, down deep into the Caribbean. Satcom F4 was operational but confusing. RCA had held out the hope that it would take some of the extra cable load, and indeed some services such as SPN did appear there. But the bird was doomed, from the start, in the cable industry because it did not occupy the desirable orbit segment surrounding the F3R bird. It would be more than two years before the first substantial cable program services would show-up on F4. Some of the early F4 programmers were not destined to last long, in spite of hefty initial funding. 'The Entertainment Channel,' backed by RCA and Rockefeller, folded up in less than a year. They would not be alone; a healthy list of failures would build up during 1982 and 1983, including the highly acclaimed 'CBS Cable' project.

**Amplifica** entered the fray in June of 1982 with their RC-10 receiver. A strangely shaped unit, it was the product of a firm which was owned by Comsat. The distance between those who looked at us with great suspicion and those who sold to us was getting smaller and smaller all of the time.

**Arunta Engineering**, in the fall of 1981, had pioneered audio sub-carrier tuning. You have to remember that the first receivers offered just spot-frequency audio sub-carrier tuning. 6.8 MHz was stan-



# PREPARE TO RECEIVE VISITORS FROM SPACE.

## TV VISITORS FROM SATELLITES

Welcome to a range of television programming you've never experienced before—signals from the satellites, captured with perfect clarity by Uniden®, a recognized leader in electronic communication. And all for a low initial investment, about the same cost as a good projection TV set.

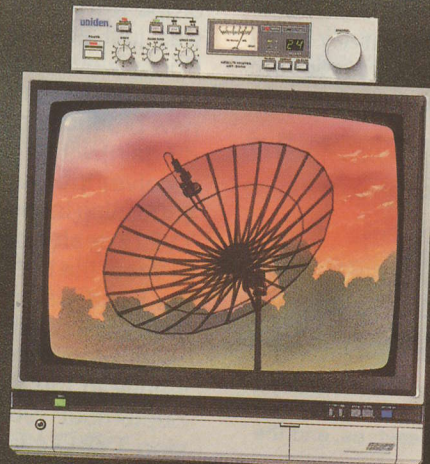
### THEY'RE HERE!

Today, many television signals are beamed down from Geo-stationary satellites. Uniden® is making these signals more and more available to private homes with a simple yet highly sophisticated system of components. Your home becomes a private earth station, able to receive over 100 channels day or night. And since October of 1979, it is authorized by the Federal Communications Commission. You'll watch it all: unlimited first-run movies,

all kinds of sports—football, golf, basketball, tennis—educational TV, the Performing Arts and more.

### WHY UNIDEN® BEATS THE SYSTEM

Because we are a complete system—



## Uniden Satellite TV Systems

Uniden Corporation of America, 200 Park Avenue, Suite 3724, New York, New York 10166

compatible, professional, state-of-the-art components designed to fit together and work together as one finely-tuned, highly-advanced system. From the environmentally attractive dish to the advanced receiver, Uniden® offers efficiency and simplicity that is compatible with your existing home entertainment center, from TV to VCR to stereo. And the entire Uniden® system is FCC approved and easy to install.

### LET THE INVASION BEGIN!

So prepare to receive visitors from space. See your nearest Uniden® Dealer. And get ready for an outer space invasion like you've never seen before.

**uniden®**  
SATELLITE TECHNOLOGY



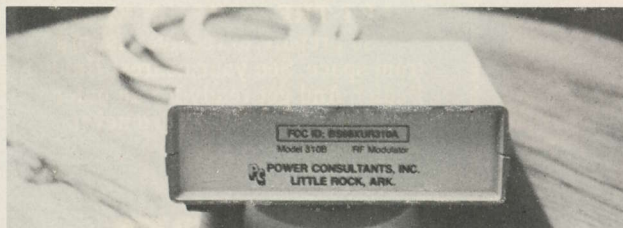
dard because that was the frequency which corresponded with the RCA (cable) transmissions. Then many receivers added 6.2 MHz since some Westar and ANIK transmissions 'hid' their audios on this sub-carrier frequency. As the satellite transmission world matured, additional, new sub-carriers came along. Arunta cashed in on this by offering a secondary tuner for the audio portion of the receive terminal. ICM had previously brought out a unit that did the same thing, but it was Arunta that concentrated in this limited area.

England's **Steve Birkill**, back in the UK after a brief attempt at creating a TVRO receiver for SatFinder in the USA, was bound and determined he was going to start a TVRO industry in Europe. He participated in several ten foot installations in and around London, writing about the results with the Russian G(h)orizont satellite in CSD for July of 1982. His reports all sounded very familiar, but unfortunately the interest in a single channel of Russian television, in England, was worse than low. The tests worked but the public could care less. It would be the fall of 1983 before Birkill had any real activity going in Europe and then it would be a 12 GHz business.

The Russian G(h)orizont satellite figured in another July 1982 report; a television station in North Carolina somehow managed to get permission to install a dish and take a live feed of Doctor Billy Graham in Russia, to North Carolina, via G(h)orizont. This trick would not be repeated until the month of August, 1984 when Ted Turner would also get special permission to use G(h)orizont to bring in feeds from the 'Friendship Games' to Atlanta's CNN.

AVCOM came along in 1982 with a receiver that was specifically designed for the unusual problems in international TVRO reception.

One firm in Arkansas, **Power Consultants**, had taken their modulators to the FCC for 'certification' and CSD used space in the July issue to show other firms who were avoiding this 'requirement' just how easy it was, and how little was really involved. Not everyone would heed the advice; the FCC would bounce back in May and June of 1984, two years hence, and warn more than 30 TVRO OEMs and distributors against selling products that had not been certified by the FCC. By 1984 the problem would have grown substantially and the FCC, usually not benevolent in such situations, would warn that substantial cash fines and equipment



**MODULATORS/** such as this one from Power Consultants, caused the industry plenty of problems in 1982. We didn't learn our lesson, which Power Consultants tried to teach us, and the FCC hit again in mid-1984.

confiscation would follow if their rules were not obeyed. By now the price of compliance had gone up; a typical OEM would fork over upwards of \$5,000 in legal and engineering fees in 1984 to accomplish what they could have done in 1982 in 30 minutes time.

Unbeknown to ABC, they had been providing home viewers with some of the most amusing, if not downright entertaining, weekday evening television since the dawn of TVRO. ABC newscaster **Max Robinson** nightly uplinked his contribution to New York for **ABC World News Tonight** from Chicago. Max would be 'up' an hour early or more. He would go through an elaborate routine getting ready for his brief inserts, often had his hair cut on air, and he always had a glass with ice and tomato juice(!) in his hand. His verbal swipes at the (largely) white staff were incredibly outspoken and he was a relentless task master to subordinates (everyone was a subordinate). After several years of Max, people came to rely on his antics and eventually word leaked back to ABC that an entire legion of viewers were tuning in the X Rated Max. A bar in South Carolina even featured a two hour long 'Bloody Max Special' period when the drinks were half-price. Inside the bar, on the big screen Max was 'tuning up.'

It had to come to a close, as it was hardly family television. ABC began by shutting off Max's sound in the summer of 1982, opening up his mike only when he had real words to say to New York. The end of an era that began in 1978, and he was promptly missed by many.

A new company called **Echosphere** came into CSD in the summer of 1982. In just two years they would have grown to the largest TVRO distributor in the nation.

#### **Omaha. August 5-6-7. The first SPACE show.**

SPACE made most of the news at its own show; it would re-structure itself and make room on the Board of Directors for SMATV system builders/operators, and, dealers. Distributors, for now, were 'left out.' Lively sessions followed after an original Rick Brown plan to create totally separate 'Boards of Directors' for SMATV, dealers, and manufacturers. The final count for the 16 man board; 9 manufacturers, 4 dealers and 2 SMATV. That number arrangement would not be cast in stone.

In the hardware area, those expecting major price drops were disappointed; the major fall selling season was just ahead, and equipment was in short supply. Prices would hold up, at least until winter. What those who knew where to look did see were some disquieting new products from the Far East; a 120 degree LNA (50 dB gain) with a landed-US cost price of \$125, and a full receiver package (downconverter plus receiver) for \$300, also landed in the USA. Of course these were not TVRO dealer prices; not unless the dealer was willing to 'meet the boat' with huge sums of money in hand. But the trend was clear; US manufacturers were about to face considerable new competition from 'off-shore.'

Off shore, from another direction, would figure prominently in the start of TVRO's fourth year as CSD for September 1982 announced the next event in the non-stop TVRO show world; Atlanta on October 29-30-31.

In a wo  
dish dri  
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these is  
control s

*It's easy*

The cor  
designed  
means y  
circuit d  
power fai  
two adjust





# SAFE & Simple

## *The Surveyor III*



*5 Year Warranty*



In a world of complicated and temperamental fish drive systems, it's nice to know that some things remain simple. And dependable. One of these is the **Surveyor III** motor drive and control system from Boman Industries.

*It's easy for you. - Plus total safety.*

The control features a lock-lamp system designed to make programming simple. That means you'll save installation time. And its circuit design *prevents memory loss due to* power failure. The 36 volt motor drive features two adjustable limit switches for safety, 1500 lb

lift capacity, and complete water sealing. That means you'll save service calls.

*And it's easy for your customer.*

Interchangeable, illuminated index tabs correspond to sixteen programmable selector switches, making this control extremely easy to comprehend, and even easier to operate.

So, why not make life a little easier for yourself, with the model AMC101/460 motor drive and control system from Boman Industries. It's simple, and it's dependable.



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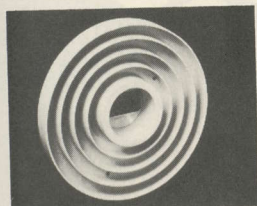


# SEAVEY ENGINEERING ASSOCIATES, INC.

Highest  
Performance

## STANDARD 4 & 6 GHz ANTENNA FEEDS

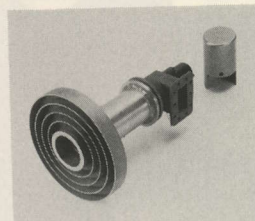
Most Complete  
Product Line



Model ESA-40

### LINEAR POLARIZED FEED

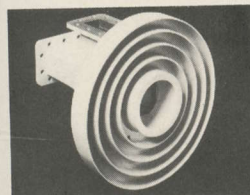
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Linear (Note 1)  
VSWR ..... 1.3 Max.  
RF Port ..... Mates with  
CPR-229 Flange  
For F/D ..... See Note 5



Model ESR-40C

### INTELSAT CP FEED (★)

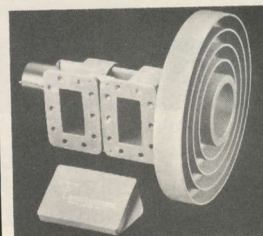
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Remotely Selectable  
Left and Right-Hand  
Circular and Linear.  
VSWR ..... 1.4 Max.  
RF Port ..... CPR-229F Flange  
For F/D ..... See Note 5



Model ESA-44

### DUAL POLARIZED FEED

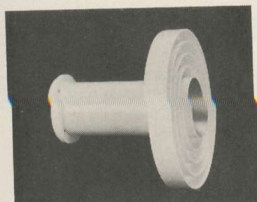
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Dual Linear (Note 1)  
VSWR ..... 1.25 Max.  
Isolation ..... 40 dB Min.  
RF Ports (2) ..... CPR-229F Flange  
For F/D ..... See Note 5



Model ESR-44

### DUAL FEED, ALL-POLARIZATION

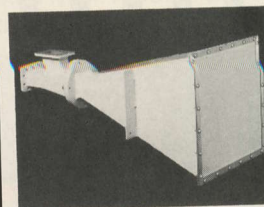
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Dual Linear,  
Remotely Variable  
VSWR ..... 1.5 Max.  
Isolation ..... 25 dB Min.  
RF Ports (2) ..... CPR-229F Flange  
For F/D ..... See Note 5



Model ESA-40C

### CIRCULAR POLARIZED FEED

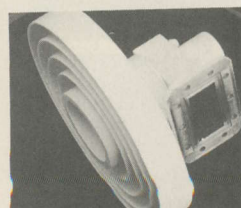
Frequency ..... 3.4-4.2 GHz  
Polarization ..... Circular (Note 2)  
VSWR ..... 1.5 Max.  
Axial Ratio ..... 2 dB Max.  
RF Port ..... Mates with  
CPR-229G Flange  
For F/D ..... See Note 5



Model ESC-44

### CASSEGRAIN ANTENNA FEED

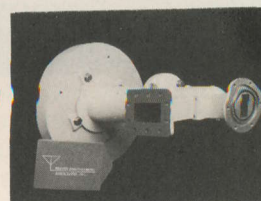
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Dual Linear (Note 1)  
VSWR ..... 1.30 Max.  
Isolation ..... 40 dB Min.  
RF Ports (2) ..... CPR-229F Flange  
Typical Cassegrain feed for 5M or larger  
reflectors. Supplied with compatible sub-  
reflector and support strut system. Options  
include circular polarization, transmit-  
receive OMT, deicing system.



Model ESR-40

### ALL-POLARIZATION FEED (★)

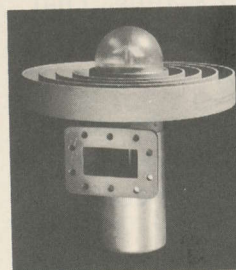
Frequency ..... 3.7-4.2 GHz  
Polarization ..... Remotely Variable  
(See Note 4)  
VSWR ..... 1.4 Max.  
RF Port ..... CPR-229F Flange  
For F/D ..... See Note 5



Model ESA-46  
and ESA-46C

### TRANSMIT/RECEIVE FEEDS

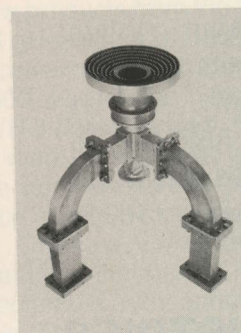
Frequency ..... 3.7-4.2 and  
5.925-6.425 GHz  
Polarization ..... Dual Linear or  
Dual Circular  
(C Model shown)  
See Notes 1 and 2  
VSWR ..... 1.4 Max.  
Axial Ratio ..... 2 dB Max. (C Model)  
Isolation ..... 35 dB Min.  
RF Power ..... 2 KW Max.  
RF Ports (2) ..... CPR-229F and  
CPR-137G Flanges  
For F/D ..... See Note 5



Model ESR-40X

### ALL-POLARIZATION DEEP DISH FEED (★)

Frequency ..... 3.7-4.2 GHz  
Polarization ..... Remotely Variable  
(See Note 4)  
VSWR ..... 1.4 Max.  
RF Port ..... CPR-229F Flange  
For use with deep reflectors (F/D between  
0.25 and 0.35). Provides between 0.7 and  
1.0 dB Extra Gain.



Model ESA-446

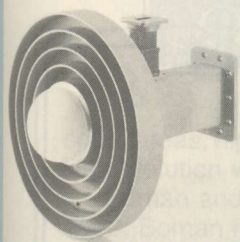
### THREE-PORT TRANSMIT/ RECEIVE FEED

Frequency ..... 3.7-4.2 and  
5.925-6.425 GHz  
Polarization ..... Dual Linear Receive  
Ports, Single  
Collinear Transmit  
Port. (Note 1)  
VSWR ..... 1.4 Max.  
Isolation ..... 70 dB Min.  
with Filters  
RF Power ..... 2KW Max.  
For F/D ..... See Note 5

- Notes:** (1) — Linear polarization is adjustable on feed.  
(2) — Sense of circular polarization selectable.  
(3) — All feeds constructed of aluminum, iridite finish  
and sealed with Kapton window or equivalent.  
(4) — Specify 2-wire DC (360°) or 3-wire servo  
(180°) actuator.  
(5) — Add dash number to feed model to indicate F/D  
of reflector. (-1) for 0.30 to 0.34; (-2) for 0.34  
to 0.40; (3) for 0.40 to 0.55.

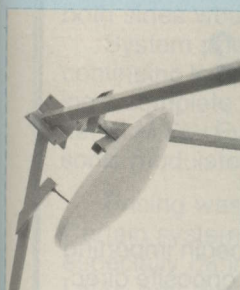
(★) Patent Pending





Models ESA-124

and ESR-124



## DUAL BAND FEEDS

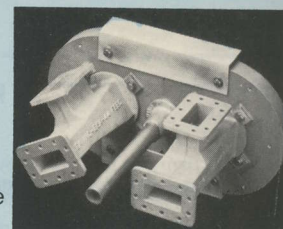
Frequency..... 3.7-4.2 GHz and  
11.7-12.2 GHz  
Polarization..... Collinear 4/12 GHz  
Ports (-R Model is  
remotely variable)  
(Note 1)  
VSWR ..... 1.4 Max.  
Isolation..... 25 dB Min.  
RF Ports (2)..... CPR-229F and  
WR75F  
For F/D..... 0.34 to 0.45

## STANDARD CASSEGRAIN SUBREFLECTORS

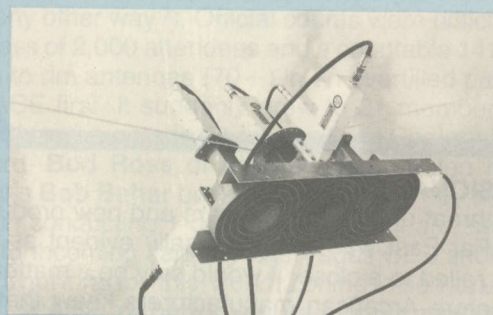
Application ..... Subreflector for  
Cassegrain  
Feed System  
Construction..... Epoxy-fiberglass  
laminated with flame-  
sprayed reflecting  
surface under  
gelcoat.  
Tolerances ..... 0.004 Wavelength,  
typical  
Mounting ..... 1/2" studs  
Options..... Specially shaped  
surfaces, deicing  
systems

## MULTISATELLITE FEEDS

Frequency..... 3.7-4.2 GHz  
Polarization..... Dual Linear  
(Note 1)  
VSWR ..... 1.25 Max.  
Isolation..... 40 dB Min.  
RF Ports (4 or 6).... CPR-229F Flange  
These multi-satellite antenna feeds  
provide simultaneous reception of two or  
three satellites from an existing parabolic  
reflector. They come with complete instal-  
lation hardware, feed support strut and  
instructions. Available for use with most  
commercial reflectors for 3° and 4° satellite  
spacings. Result is quality reception  
without need to install second or third  
antenna!



Models ESA-2 (44)



and ESA-3 (44)

## OTHER 4/6 GHz FEES AND ACCESSORIES

### MODEL

ESC-46C  
ESA-40X  
OMT-40  
OMT-46  
8119-800  
8203-5002  
8327-01  
SC-10

OPTION 'P'  
PR-40  
8300-114  
8300-119  
8300-14  
8300-118

### DESCRIPTION

**CASSEGRAIN FEED SYSTEM**, 4/6 GHz, Circ. polarization. Includes subreflector.  
**DEEP DISH FEED**, Linear polarization. Use with F/D between 0.25 and 0.35. Has extra gain.  
**4 GHz ORTHO-MODE TRANSDUCER (OMT)**. Includes Kapton window. 40 dB Isolation.  
**4/6 GHz TRANSMIT/RECEIVE OMT**. CPR-229F and CPR-137G flanges. 35 dB Isolation.  
**4 GHz CIRCULAR POLARIZER**. 1.25 VSWR (Max.), 2 dB axial ratio (Max.)  
**4/6 GHz CIRCULAR POLARIZER**. 1.30 VSWR (Max.), 2 dB axial ratio (Max.)  
**SPHERICAL FEED HORN** for long focal length reflectors. Several polarization choices.  
**SERVO CONTROLLER**. Use with any ESR feed having servo. Has interface to receiver for automatic  
polarization selection plus skew control. 110VAC, 12W.  
**90° POLARIZATION STOPS**, for any ESR feed having DC actuator. Provides stops at 0°, 90°.  
**POLARIZATION ROTATOR**. Interfaces with any faceplate. Specify DC or servo type.  
**AFC ADAPTOR KIT**, converts AFC feeds to automatic polarization switching.  
**HARRIS ADAPTOR KIT**, converts Delta Gain feeds to automatic polarization switching.  
**WAVEGUIDE ELBOW KIT**, includes E-bend, gaskets, hardware. For any ESR feed.  
**WAVEGUIDE FLANGE HARDWARE KIT**, includes half or full CPR229 gasket, hardware.

### Also available from Seavey Engineering are:

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- Line-of-sight antennas and feeds — 2 to 24 GHz.
- Tropospheric scatter feeds — 1, 2, 4 and 7 GHz.
- Standard Gain horns — 1 to 12 GHz.
- MARISAT and GOES Satellite antennas and feeds.
- Multisatellite Feed Kits for all standard reflectors.



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## YEAR FOUR/

## SURELY 'THIS' WOULD BE 'THE YEAR'?

### PROFESSIONALISM Shows . . .

If the threat of new pricing wars and new products from the Far East was not universally evident as the third year rolled to a close, it would only be a matter of months before American manufacturers knew that at least one European firm had special talents in our area.

The firm was **Luxor** and it was one of the largest firms in Sweden. They had been building consumer electronics for Europe for nearly sixty years when an arrangement was fashioned between Luxor and an American distributor named **Jim Rothbarth**. The plan was this:

- 1) Rothbarth's **STS** firm, operating from St. Louis, became the exclusive importer/distributor for a brand new TVRO receiver from Luxor.
- 2) The receiver was 'less than complete' in that the Swedish firm did not plan to build their own down-converter. Rothbarth, through the American microwave industry, would arrange for that separately.

Rothbarth proved to be the consummate marketing man for a young industry. His concept of product features and product marketing quickly established the Luxor brand receiver as 'the name to beat.' He began it all by breaking the product at the Atlanta STTI show in October.

That the receiver first shown in Atlanta did not work THAT well, or that the receiver was going to be in very short supply for quite some time did not seem to slow down the dealer interest. Within a year, a CSD study would reveal Luxor-by-Rothbarth had risen from no market share to almost a ten percent market share. People 'loved their Luxors' and Rothbarth turned many heads with his flamboyant style of marketing.

The Rothbarth/STS and Luxor arrangement would come to a crashing end early in 1984, slightly more than a year after it began. Luxor said they were unhappy with Rothbarth's choice in downconverters which they felt was contributing to a less than savory reputation for the product. Since they did not manufacture, nor control the selection of the downconverters, they took steps to regain distribution of the Luxor receiver line from STS. When it was all over, neither side won and the attorneys made money on both sides. Luxor would come out of it

'whole' but wounded; Rothbarth would begin importing a new line of receiver products from the opposite direction, Japan.

Motels and hotels got considerable interest in the fall of 1982. The Motion Picture Association of America (MPAA) was planning a 'crack down' on those locations where the rental-room operators were alleged to be 'stealing' premium program services, such as HBO or the recently activated Playboy Channel. MPAA claimed these locations were bypassing their local cable firms and going directly to the satellite. They were not paying anyone for the services, either. CSD investigated and found the allegations all-too-true. The industry was forced to look at itself in the mirror and some of what it saw it did not like.

**Robert Maniaci** of Boman Industries agreed to sit for an interview with Coop and it appeared in the October 1982 issue. Boman's head man explained how his firm got into the business and how their selling philosophy differed, he felt, from others in the field. Boman had a substantial history in the consumer (auto) sound business and their considerable resources were giving some sellers of TVRO system hardware uneasy nights.

Scrambled transmissions, especially professional boxing events, were getting more and more attention. Promoter Don King had set up a satellite fed network system to interconnect hundreds of stateside locations to his well promoted events. The Oak Orion scrambler system was usually employed so that people could not view the event without permission.

Several 'new names' were cropping up in CSD; **Wespercom** was a fast growing distributor in the northwest, with a single office in Bend, Oregon at the time. **California Amplifier** was a new name in LNAs, having been formed when several key employees from 'old-line' LNA supplier Amplica broke off to start their own firm. Amplica had proven that if you work hard, you too could become a part of the Comsat empire and the original owners had all done very well when Comsat acquired the firm for an estimated \$60,000,000 in stock. Cal Amp founders would break several records between start-up and going public on their own. At least in



some areas, high-tech stocks associated with the satellite revolution were looking very profitable!

Boman and Chaparral 'got into it' late in the fall of 1982; Boman had introduced their own version of the automatic polarity switching system (Polar-matic) and Chaparral claimed that some of the literature being passed out bore a striking resemblance to Chaparral 'original' equipment. Boman would publish a 'Clarification Notice' in CSD for November 1982. One year later both sides would be seeking additional clarification.

System prices, Boman's price leaders aside, were continuing to drop. Wespercom, for example, was offering a complete 11 foot antenna system (Ranger antenna, KLM Sky Eye V receiver, M/A-COM LNA and Panasonic modulator) for \$1595.

Pricing was not the largest problem; delivery was. Certain system bits and pieces were very hard to find, especially during the seasonal sales bulge in the fall. LNAs and the new, much desired automatic polarity rotation systems, were especially difficult to locate. **Microwave Applications Group**, advertising in the November CSD, headlined "Delivery. More Than Promises" for their polarization system.

Professional packaging of complete systems was becoming big business. **Winegard** jumped into the industry with both feet, initially offering a 'square dish' and electronics. They started another marketing trend; taking dealer statements and building testimonial advertising around those statements. The approach was valid

since many new firms in the field were selling equipment which had, at best, a flimsy foundation in technology.

**Satellite TV Magazine**, the first 'consumer publication for TVRO' was up and running late in 1982. They wanted dealers to carry the publication as a 'newsstand' product and ultimately they would claim more than 20,000 consumer newsstands handling it by mid-year in 1984. It was becoming harder and harder to escape the 'TVRO message.'

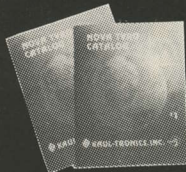
**Atlanta.** October 29-30-31. The biggest yet (could it be any other way?). Official counts were difficult, but in excess of 2,000 attendees and a countable 141 booths. Rim to rim antennas (70+) in an overfilled parking lot. SPACE first. It suddenly grew to 21 members on the board and created a new position; Chairman of The Board. **Bud Ross** of Birdview was seated here and Hero's **Bob Behar** became President. They decided to begin conducting 1-day SMATV seminars, such as at the forthcoming January Las Vegas CES show; a program not long for 'this' world. Zoning raised its ugly head and SPACE zeroed in on early communities (Hollywood, Florida, and Carmel, California) where community leaders were 'banning' TVRO antennas.

On 'The Morning TV Show,' seen throughout the hotel complex, Echosphere's **Candy McAdam** and National Microtech's **Dave Fedric** pointed out that the role of distributors was changing rapidly. The duo agreed that two and perhaps three separate levels of distribution were now forming; the true national distribu-

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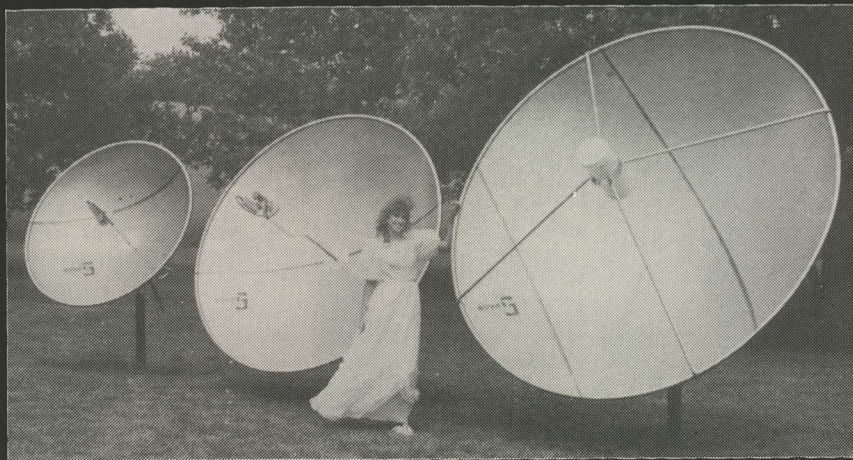
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tion firms (although none yet had more than one, central warehouse), the regional firms (which is what most really were) and the zealous dealers who bought slightly more than they could use themselves, to get better pricing, and then re-sold their excess at a slight profit.

A chain store experiment, **Wal-Mart** in Arkansas and Oklahoma, was off and running. Boman was behind this one and while it would not be a success, that would not deter others (such as **Montgomery Wards** in league with Winegard) from trying again in a year or so.

Luxor stole the show with their highly-eye-appealing consumer designed receiver. Several others tried and Arunta's Ed Grotsky commented "By the time this industry gets to Las Vegas (the next scheduled show), any receiver manufacturer who doesn't have the glamour and glitter of consumer design will be far back in the pack . . .".

Taylor Howard shook up the crowd when he appeared on the stage to state "Virtually every antenna in the display lot is awful . . .". He was commenting on the lack of structural integrity he saw, and the companion degraded performance that occurred when the antenna was not 'stable.'

Down-scaling performance, with 'class,' was the goal of industry pioneer **Norman Gillaspie** who was



**NORMAN GILLASPIE/** a pioneer from the old school, got everyone thinking about six foot dish systems (and smaller) at the Atlanta blow-out.

back for 'another shot.' Gillaspie, one of the original receiver manufacturers from San Jose's 1980 show, had been in and out of receiver production through the interim years. At Atlanta, he upset many by displaying a six foot antenna 'system.' Norman had done it right; an accurate six foot reflector surface, a 'tuned feed' (that would come back nearly two years hence, at Paracclipse) and a complete receiver system. That someone with Norman's reputation would 'dare show' a system with a six foot dish bothered many. Alas, by the next show in the spring, six foot dishes would litter the antenna lot.

Norman 'bottom-ended' a new trend that first appeared in Atlanta; dish systems under 10 feet in size. There was the first army of '8 footers' at Atlanta and as noted that would turn into an 'army of 6 footers' (and smaller) by Vegas. Some people attributed the quite-decent pictures on the Gillaspie system to Norman's abilities; which were considerable. The truth was not quite so complicated.

The newer satellites, including W4 and F4 and at least six of the transponders on F3R, were simply more powerful. They were 2 dB or more 'stronger' than the previous generation of satellites. If you added 2 dB of signal to the satellites, you could 'back out' 2 dB of system 'gain' at the TVRO. And that simply meant smaller antennas would play. It was an all too obvious 'fact' that would escape many for several more months.

**1983 dawned** bright, clear, and slightly confused. CSD named not one but two industry people as 'Man Of the Year'; **Jamie Gowen** who founded ADM and **Andy Hatfield** who founded AVCOM. Both were cited for their dedication to helping dealers and newcomers to learn the right 'ropes' in a straightforward manner.

The January issue of CSD, in addition to announcing the two leaders, reported on a very unusual event that had followed the Atlanta show; a group of 20+ had gone on a 'Satellite Retreat' into the Caribbean; the Island of Providenciales where Coop operated a national network of television stations. There, out of reach of telephones and other 'modern communication systems' the group brainstormed on where the industry was headed and how the industry might best make use of its limited resources.

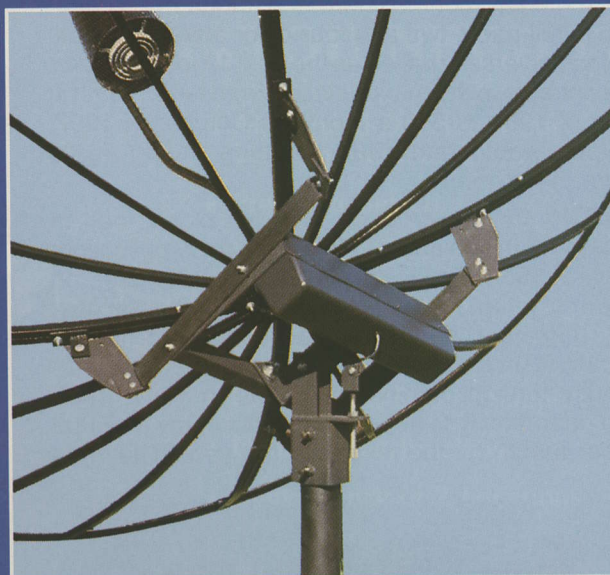
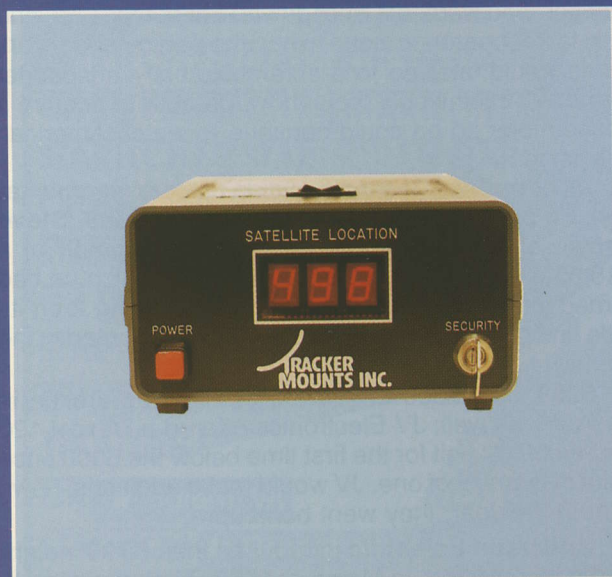
The industry tried to support its own television program, early in 1983. **George Mitchell**, out of Salt Lake City, brought more than a quarter century of television production experience with him as he lashed together '**Sat Scene; The Satellite TV Magazine Of The Air**' on a weekly basis. The program began on transponder 18 of F3R on Saturday afternoons, eventually moved to TR 22 and finally stopped altogether in the fall of 1983.

National Microtech founders **Horton Townes** and **Dave Fedric** left the firm shortly after the Atlanta show. After the shake-up, **Larry W. Ward** who left M/A-COM to take on the Presidency of NM was running things. Fedric and Townes would start something called 'Satellite America,' patterned loosely after National Micro-



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tech.

**Paracclipse** woke some people up starting in 1983. **David Johnson** had hauled what he thought was a good, working version of his 12 foot antenna to Omaha in the summer of 1981. The well run Omaha Antenna Shoot Out had proven to him that his antenna was not yet market-ready; it had considerable problems with 'noise.' Eighteen months later his antennas were popping up in full-page, two and four-color advertisements and being universally hailed as the best 12 foot consumer style antenna in the marketplace. From ten a month in October of 1981 to 300 a month in October of 1982, Paracclipse would end 1983 shipping nearly 4,000 antennas in a month.

**LOCOM**, the 'new kid' on the LNA block, tried to teach us a few things about LNA design and application; February of 1983. The Pennsylvania manufacturer, an outgrowth of a firm that specialized in military and government high-tech hardware, had adopted a fiercely 'American' stance in a field which would become predominantly foreign dominated by late in 1984. Their start-up operation was hoping to ship as many as 2,000 LNAs per month by the middle of the year. They had

signed a contract with Intersat for openers.

An installation for the President of the Philippines highlighted a February issue; the Hero 20 foot system was designed to bring in Intelsat reception which would include **AFRTS** service with American sports and news. The installation would attract some interest, and President Marcos would ultimately 'give in' to American authorities who wanted it 'shut down.' But not for long, and only for 'appearance' sake; when the particular network feeds would later go to a scrambled/half-transponder format, Marcos would 'somehow' be able to acquire a descrambler so he could continue to watch American television.

All of this high technology didn't stop experimentation; on page 74 of CSD for February of 1983, **Steve Crowe** of Los Angeles published a photograph of a \$19.95 metal backyard 'beach umbrella' which he had turned into a TVRO antenna by simply laying it on its side and sticking a feed on a broomstick mounted in the center!

**\$299.** The \$300 LNA price barrier was broken in February as well; JV Electronics offered a Dexcel 120 degree 50 dB unit for the first time below the \$300 price point in quantity of one. JV would make additional news later in the year; they went bankrupt.

**Anderson Scientific** introduced their ST99 'neighborhood' receivers in March of 1983. Their concept, to be amplified by several imitators in the next 12 months, was to use a single dish, LNA and downconverter to feed, through appropriate cable and line splitters, virtually an unlimited number of individual satellite receivers. It was sort of cable TV except that it lacked all of the large costs normally associated with cable. The prices were attractive; the individual receivers had a dealer-net of \$350.

Equipment failures occupied much editorial space in April. The rush of new firms building and selling antennas, motor drives, receivers and associated parts during 1982 was beginning to hurt. On the front cover, the rusted-decay of a screen mesh dish which had taken less than six months to begin rotting in a 'dry environment'; Oklahoma. Dealers were writing in increasing numbers to complain about product failures and there was an awakening to the fine print in manufacturer warranty statements. Many did not like what they saw.

**Las Vegas.** March 15-16-17. The start of the really big shows. There were 260 booths and perhaps 200 antennas. Counting the antennas, even from the perspective of an enlarged photograph taken from the roof of a nearby building, was impossible. On the ground, they extended as far as the eye could see. People. Three thousand? Four thousand? Five thousand? Nobody knew for sure but the airplanes coming into and going out of Vegas were a virtual shuttle service from throughout the USA. The industry was simply out of control.

SPACE Directors, meeting in Las Vegas, elected to have their own Vegas show the following year. How that



**RETREAT? HELL!** Intersat's David McClaskey prepares to sample a Provo lobster snared by Canadian TVRO engineer Jan Spisar (standing). Somebody forgot to tell David you have to cook the lobster first.



# DEALERS...

## ...YOU NEED IT

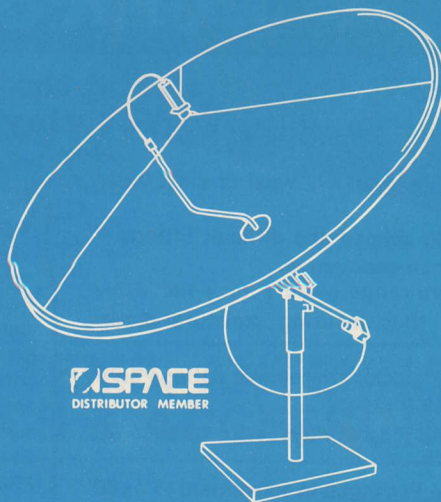
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would sort out with the plans of STTI to come back again would have to be worked out.

**Transponder aging.** Everyone knew that nothing lasted forever, but few of us suspected that satellite transponders might last so short a time! The July 1983 issue reported on the relative 'signal strength' from the popular F3R cable bird; comparing when it was first put into service, and then some 15 months later. The numbers told us that those people who were installing smaller dishes (such as 6, 7 and 8 foot) and 'getting by' today were in for a rude awakening in a couple of years; that each year the transponders ran, they lost a measurable amount of transmit power. This 'aging process' would become severe enough before the satellite was retired that many of the popular transponders on F3R would go totally away on the 6 and 7 foot antennas at most locations. That caused some excitement but was then forgotten in another six months as a new Hughes Galaxy satellite came along with even more potent signals over the USA.

CSD published an industry wide dealer survey in our June 1983 issue; the first such survey of dealer buying trends. We found a very large percentage of dealers were unhappy with the products they were getting and many named-names.

**NASDA.** They were to be a national dealer organization. Headquartered in Salt Lake City, they promised everything from insurance programs to educational seminars, sales aids to a monthly newsletter. It didn't fly.

**Minneapolis.** June 24-25-26. The first of the sum-

mer shows for the industry (a Niagara Falls show in June of 1984 would be the second). It had been billed as a Canadian-American show but somebody forgot to tell very many Canadians. Lightly attended, held during a part of the year when sales traditionally drop way off, the show was notable only for one thing: the fertilizer that would deeply impregnate the brewing feud between STTI and SPACE would be cast in stone here.

Year four rolled to a close with a classic CSD article dealing with the new **Hughes Galaxy** satellite. CSD had pieced together enough details to see a 'master plan' formulating at Home Box Office. They would use Galaxy One to 'bundle' perhaps 8 or 9 separate channels of service, scrambling them all, and offer them to individual homes. CSD explained how the service would work and forecast the part that TVRO dealers would play in it. That was the good news. The bad news was that when this happened (it has still not happened as we start year six although it appears, now, very close), all of the regular premium services such as Showtime and The Movie Channel and Cinemax and of course HBO would 'scramble'; effectively eliminating them from viewer choice. This whole scenario would start a worrisome year for the industry which would admit, under pressure, that it **was concerned** what might happen to the marketplace if these premium grade services disappeared. The scientists in the crowd said 'don't worry, there is a way out of this.' The politicians in the crowd said 'don't worry, we can negotiate out of this.' The dealers were not so sure.

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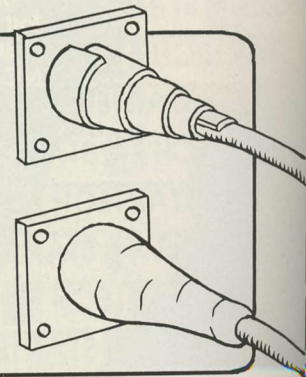
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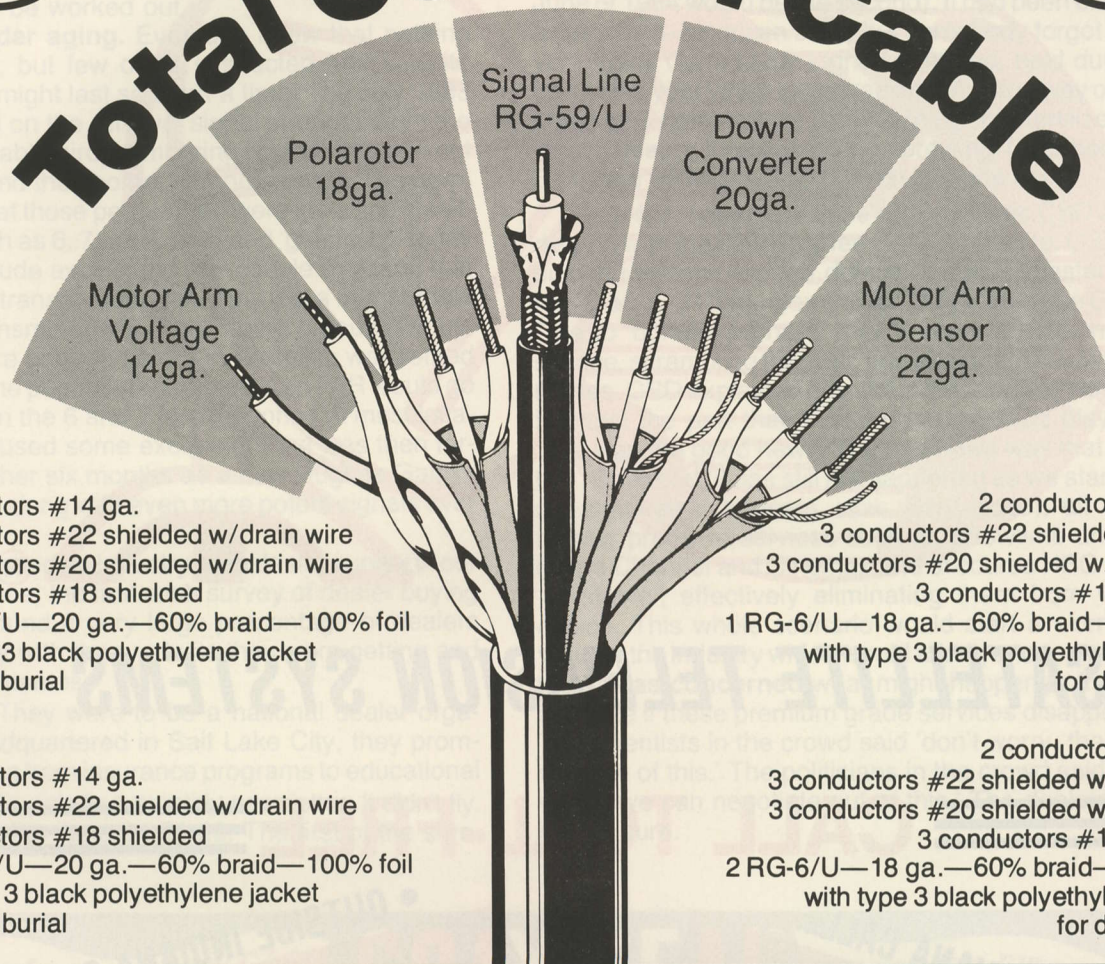
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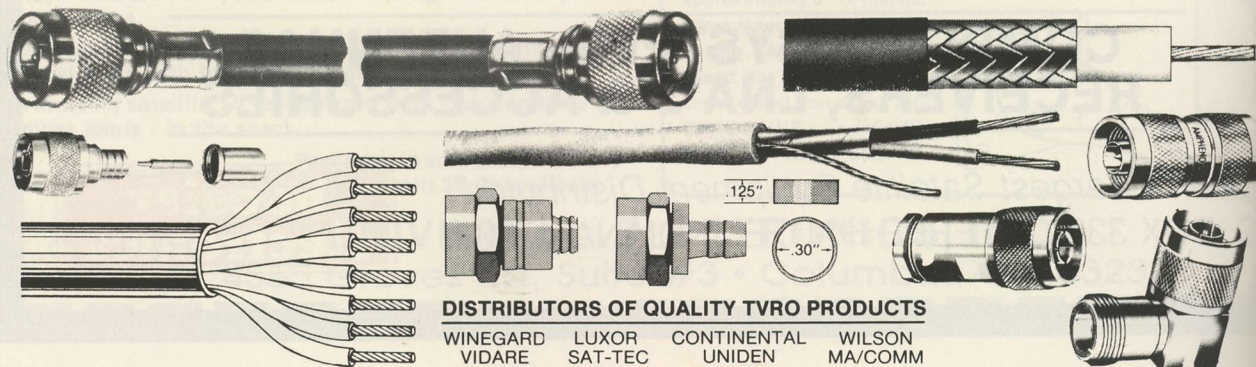
2 conductors #12 ga.  
3 conductors #22 shielded w/drain wire  
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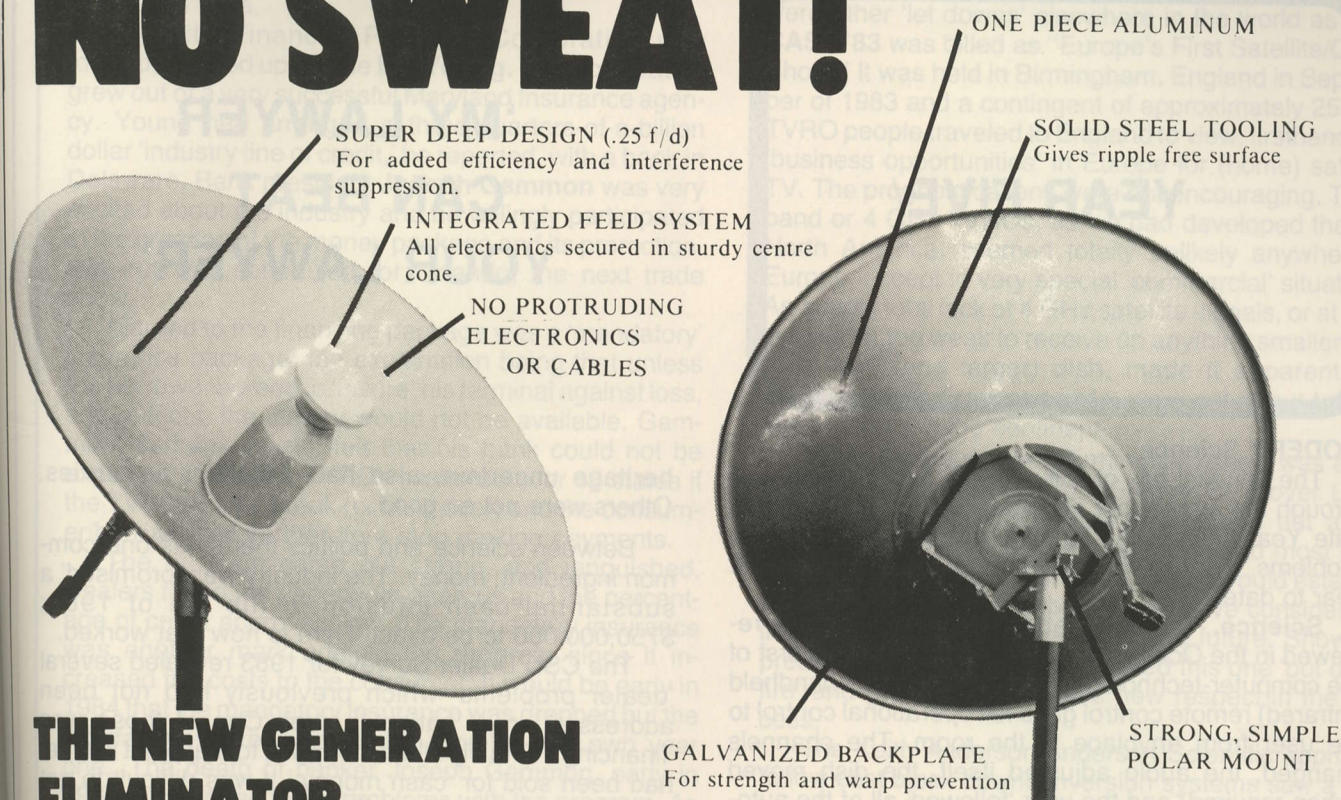


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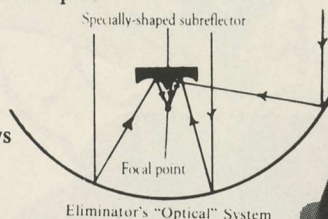
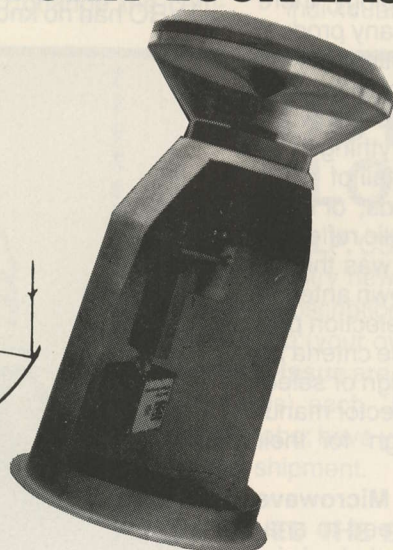
It's the all-new modified parabolic design coupled with an extremely deep (.25 f/d) curve and a "Shaped" subreflector that is up to 20% more efficient than the best parabolas.

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## YEAR FIVE/

### MODERN Science . . .

The unusual mix of science and politics continued through the start of our fifth year. Politics would dominate Year Five as the industry grappled with 'people problems.' In many ways, it would be the most unsettled year to date.

**Science.** The Intersat IQ-160 receiver was reviewed in the October 1983 issue. This was the first of the computer-technology-based receivers. A handheld (infrared) remote control gave full operational control to the user from anyplace in the room. The channels changed, the audio adjusted itself, the dish moved (when required) and the user 'followed' all of the automatic, sequential steps with an on-screen display of information. It was all very elegant, and all very complicated. Like any brand new, complex technology, there would be a period of 'de-bugging.' But, like any product worthy of a place in the market, it would ultimately be de-bugged and ultimately it would set a standard for most of the high end, new-tech receivers to follow.

**Antennas.** You might suspect that everything to be known about antennas was known by the fall of 1983. Wrong. We didn't know as much about 'feeds,' or more precisely the marriage of a feed to a parabolic reflector, as we thought we did. The basic problem was this.

A feed is a miniature antenna. It has its own antenna characteristics. There is (or should be) a selection process with a feed; your design or performance criteria for the reflector itself will interplay with the design or selection process for the feed. Were all of the reflector manufacturers selecting the 'proper feed design' for their reflectors? Testing would find out.

A professional antenna testing range, **Microwave Specialty Corporation** in San Diego, agreed to analyze the 'feeds' from our industry. Our feeds had developed or grown up through a combination of adaptation and entrepreneurial experimentation. Some were plainly copies of others; some had unique physical properties. What we wanted to know was how each performed with its 'electrical properties.'

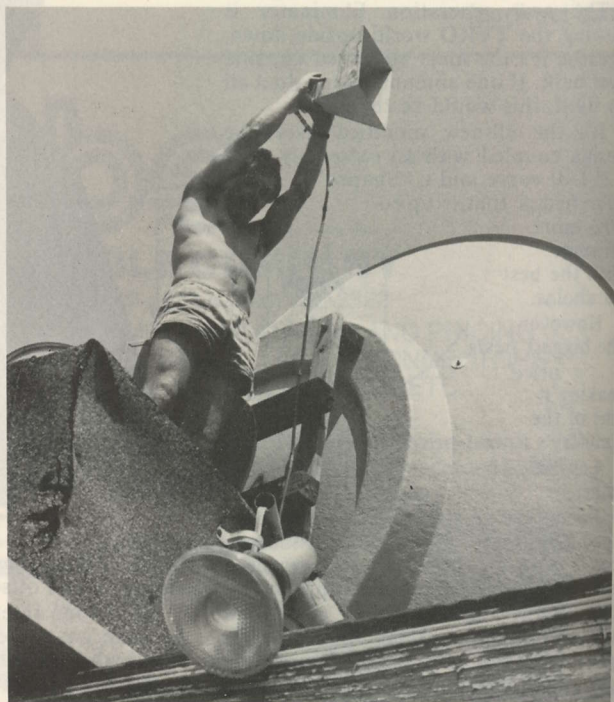
It took four issues of tedious CSD copy to sort it all out. The bottom line? Chaparral feeds, painstakingly refined by Taylor Howard and Bob Taggart, had outstanding performance. Several of the Boman feeds,

## 'MY LAWYER CAN BEAT YOUR LAWYER'

heritage uncertain, also had excellent properties. Others were not so good.

Between science and politics there was one common ingredient; money. The industry was 'promised' a substantial cash infusion in the fall of 1983; \$750,000,000 to be exact. Here is how that worked.

The CSD Dealer Survey for 1983 revealed several 'dealer problems' which previously had not been addressed on a 'national' level. One of those was 'financing.' Virtually all TVROs sold, to that point in time, had been sold for 'cash money.' It was difficult to get consumer financing for a TVRO because money lenders did not understand what a TVRO was. And, unlike automobiles which had a 'reclaimable resale value,' the TVRO had no known value. CSD wrote about this prob-



**TEST RANGE for feeds/** CSD took a sampling of all of the industry's feeds to San Diego in the fall of 1983 and we all learned alot.



lem and that writing attracted some people with expertise in this area.

Satellite Financial Planning Corporation was formed, headed up by one **Bill Young**. This corporation grew out of a very successful Maryland Insurance agency. Young had arranged a three-quarters-of-a-billion dollar 'industry line of credit,' he reported, with a bank in Delaware. Bank president **Joseph Gammon** was very excited about the industry and he willingly participated in the creation of the money package and its promotion. Roll-out was scheduled for Orlando; the next trade show.

Married to the financing package was a 'mandatory' insurance package; the explanation being that unless the borrower agreed to 'insure' his terminal against loss, and defects, the money would not be available. Gammon, perhaps wisely, felt that his bank could not be expected to finance TVROs scattered over 48 states if the TVROs might break (or blow over) and the consumer/borrower might therefore stop making payments.

The program came out strong, and languished. Dealers found the paperwork onerous and the percentage of credit approvals low. The mandatory insurance was another mark against the program since it increased the costs to the consumer. It would be early in 1984 that the mandatory insurance was dropped but the program never really fulfilled its promise in its own 'year one.' The death of banker Joseph Gammon, early in 1984, also added to the problems with the program. As SFPC started its own 'year two' and we began our own 'year six,' major changes in the program were promised.

If US financing packages didn't change the com-

plexion of the industry, as many had anticipated, there were other 'let downs' elsewhere in the world as well. **CAST '83** was billed as "Europe's First Satellite/Cable Show." It was held in Birmingham, England in September of 1983 and a contingent of approximately 25 U.S. TVRO people traveled to England to view, firsthand, the 'business opportunities' in Europe for (home) satellite TV. The prognostications were not encouraging. The C band or 4 GHz TVROs, as we had developed them in North America, seemed totally unlikely anywhere in Europe, except in very special 'commercial' situations. An almost total lack of 4 GHz satellite signals, or at least signals far too weak to receive on anything smaller than a 20 foot (and larger) dish, made it apparent that TVROs, North American style, were not about to 'bust out all over' on the continent.

While the September Birmingham show was a disappointment, a September US show held over Labor Day weekend in Nashville was anything but a disappointment. Easily the best attended and most business-profitable industry show to date, it would establish a precedent for shows which would have considerable impact on the show schedule of the future. Show impresario **Rick Schneringer** pulled this one 'out of the fire' and gained considerable new respect in the process.

The Keith Anderson/Anderson Scientific approach to low-cost block downconversion systems saw a new twist in the fall of 1983. CSD reported that a system had been constructed, in the Caribbean, which actually re-broadcast 12 satellite TV channels **through the air** to individual homes.



## OUTSIDE TVRO LOOKING IN?

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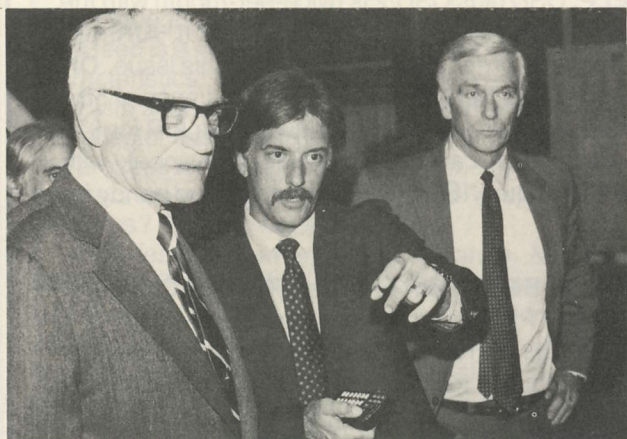
**Orlando.** November 3-4-5. This was the second 'trade show' for SPACE. It was controversial before it opened.

Following a well tuned political sequence, the gathering featured a number of political dignitaries; Congressmen Rose and Tauzin, early supporters of our technology, and the highlight politico of all, **Senator Barry Goldwater**. Another non-political 'folk hero' was on hand to address the throng as well; **Ted Turner** of WTBS fame.

The SPACE show was not the largest to date, but it was very respectable. More than 200 exhibit booths and perhaps 100 antennas were set up and a crowd of several thousand kept up a frenzied pace. Behind the scene, negotiations were underway to end the 'war' between STTI and SPACE. The goal? To reach some sort of accommodation between STTI and SPACE concerning the forthcoming Las Vegas twin-shows booked for the same month in the same city; March of 1984. An agreement seemed to be reached, only it would be breached by one or both sides within weeks of the verbal understanding. That would set the stage for a nasty winter round of legal battles that would ultimately leave the industry badly divided and disorganized.

**Goldwater clearly was in favor of home TVROs.** He would prove that in five months time by introducing new legislation into the Senate to 'clarify' the infamous 1934 Communications Act; a clarification that, when adopted, would totally legalize the ownership and use of a home TVRO. Goldwater would 'quip' that he had been attempting to build his own TVRO, at his Arizona home, for some years; using 'surplus' parts he had uncovered in the normal (amateur radio) surplus channels. By Christmas time, Goldwater would have a **brand new terminal** supplied to his local Amateur Radio Club by suppliers in the industry.

For three weeks in the fall, between the SPACE Orlando show and the installation of the terminal for the Goldwater amateur radio group, there was a breathing



**WATCH THE SCREEN/** Senator Barry Goldwater is given directions by Intersat's David McClaskey while Astronaut Gene Cernan looks on in Orlando. The Senator was intrigued with our technology; enough so that he introduced legislation to 'protect us' from lawsuits in March of 1984.



**UNIDEN made the group feel very much at home!**

spell. A group that would ultimately number 25 headed from San Francisco west; a delegation of TVRO industry people, from Canada and the United States that would eventually end up in the island nation of Sri Lanka as guests of **Arthur C. Clarke**. Ahead of the group, three massive antenna systems (a 20 foot ADM, a 25 foot Hero and a 16 foot Paracclipse) had been shipped half-way around the world to Sri Lanka. The Hero and ADM antennas were to be installed at the University of Moratuwa where Clarke was Chancellor. The Paracclipse would be installed at Clarke's residence at 25 Barnes Place, Colombo.

The purpose of the trip was to fulfill a suggestion Coop had made in the **very first** issue of **CSD**; to 'reward' or 'recognize' the genius of Arthur C. Clarke, in fashioning and creating the satellite system, with a private, home terminal of his own. When more than one terminal became available, the 'extra two' were to go to the University so that students and teachers there could create a 'Satellite Technology Program' for the school.

After stopovers in Japan (to visit Uniden and Maspro), Hong Kong and Bombay, the group assembled in Sri Lanka for six days filled with the labor of assembling and installing the three massive antennas, a series of award ceremonies hosted by Clarke and University officials, and the official, formal dedication of the 'Arthur C. Clarke Centre' at the University.

Returning from Sri Lanka, the travelers found the industry on the leading edge of a legal mess that would dominate all of the first half of 1984. The verbal agreement, struck between SPACE and STTI in Orlando, had fallen apart. Rather than one 'joint trade show' in March, now there would be two again. Law suits were threatened, and then filed. Expensive attorneys were hired and legal research work begun. Within sixty days the events would have carried the industry to the brink of tolerance.

Meanwhile in Canada, the 'law' was having its day for TVRO as well. Canadian law, never any less muddled than US law concerning TVROs, had finally reached a watershed. A Canadian (high) court had ruled that a Holiday Inn, in Manitoba, 'stealing HBO' and other

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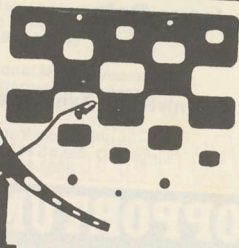
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signals from an American satellite, was breaking no Canadian law. This meant that anyone who wanted to 'take' US satellite signals from an American satellite could do so, in Canada, even in commercial establishments; provided the signals were not sold nor charged for.

The industry, or parts of the industry, showed interest in SMATV. It seemed like a good way to make some money. If only the legal and technical problems could be sorted out. CSD decided to help with the technical part and SPACE was at least giving some attention to the legal problems. A series of articles began the long task of explaining how SMATV systems are designed, and how they are constructed. This series is still running in CSD and when the series is completed, a 'handbook to SMATV design and construction' will be published from the composite of the full series.

While the legal battles between SPACE and STTI ground on, the industry looked at some of the newer products entering the field and generally was impressed with what they saw. After two years of marketing, a Japanese manufactured but US conceived receiver product from **USS/Maspro** got some CSD attention in March of 1984. The receiver had been one of the first to extend remote control capability to the user without any interconnecting wires.

Computer memory drives, first trotted out way back in Houston in the fall of 1981, were finally growing up. **DRACO** and **MTI** and **Houston Tracker** now had drives

and controls that rivaled home computer systems for technology. Just barely one year prior, antenna motor drives and their companion controllers were the 'bane' of TVRO dealer lives. In that year the technology had matured remarkably and dealers were now voluntarily praising the technology and reliability of the new generation drives.

Not everything you see on a television set is television. Writer **Mark Lewis**, a Canadian enthusiast with a strong background in satellite law, described an entire family of 'hidden signals' found on satellite in our April 1984 issue. Lewis had fashioned or borrowed special decoders which allowed him to 'survey' the dozen or so specialized transmissions carrying full time weather, news and entertainment in 'digital form.'

Out of the SPACE/STTI squabble, still not settled by early May, had come a decision at SPACE to open new quarters away from the law firm of Brown and Finn and to hire a fulltime 'Executive VP' or general manager. His name was **Chuck Hewitt** and he came to the industry and trade association, as their first fulltime hired executive, from a number of allied fields. Hewitt appeared in our **CSD/2** publication for May 15th for an in-depth interview. He came across as a bright, articulate no-nonsense individual with the necessary credentials to whip the trade association into a professional posture. His first 'trick' impressed many; **he settled the dispute** between SPACE and STTI and all law suits were dropped. SPACE even got its name back.



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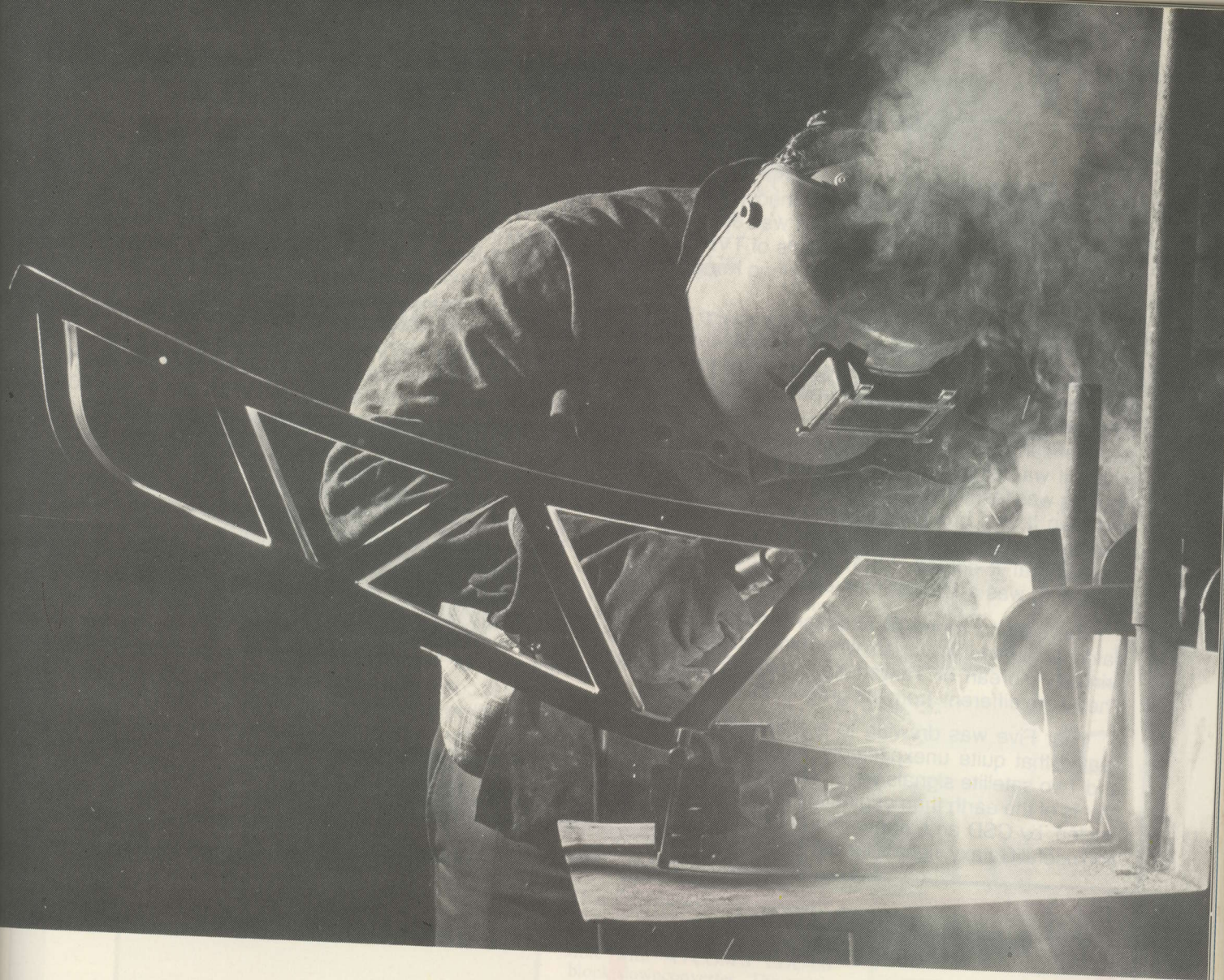
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If there was a shortage of new 'innovation,' there was no shortage of new 'products.' It was during 1984 that the first and substantial shipments of TVRO products from Japan, Korea, Taiwan and Hong Kong began to enter the market.

The first round of Oriental products were largely 'copies' of American design or Canadian design ingenuity. They lagged, as TVRO receiver designer **John Ramsey** would later point out, behind the US products by a generation or two. The modus operandi was to take an American product, such as a receiver, to the Far East where it was essentially 'copied' part for part. A new housing was fashioned to disguise its internal similarity and then it was brought back to the North American marketplace at a pricing point which was below the original that it copied. **'Just like . . . but cheaper than . . .'** was a familiar marketing phrase heard.

The second round of Oriental products, and this batch originated in Japan whereas the copies were primarily Korean or Taiwanese, arrived in mid-1984. They were different, from the ground up.

Year Five was drawing to a close when CSD revealed that quite unexpectedly, Hughes Galaxy One and Two satellite signals were covering far larger segments of the earth than originally predicted. Tests conducted, by CSD and others, found exceedingly strong and useful Galaxy signals far out into the Pacific Ocean

(west of the International Dateline) and east from Galaxy Two into extreme western portions of Europe and significant portions of Africa. The July and August issues detailed this plus also revealed that even the more well understood North American DOMSAT birds, such as Canada's ANIK and the RCA SATCOM series, had loyal viewers down into the South Pacific (Tahiti) and deep into South America (Bolivia).

**Nashville.** September 3-4-5. The last TVRO trade show for the fifth official year of TVRO. More than 500 exhibit booths, a crowd rumored to be in the 9,500 to 9,800 region. Massive is the only adequate word. Dozens of new antennas, receivers; new and even lower LNA pricing (some would quip that one day soon a \$100 LNA would be an expensive one!) and the first formal appearance before our industry, at an industry gathering, of a representative from that long time foe **HBO** (Home Box Office). **The circle was nearly complete;** the 'TV pirates' of the late 70's and early 80's were now suddenly 'respectable' and worthy of the attention of Time, Inc. (HBO). The promise of better things to come was just ahead and Year Six promised to be one filled with many new profitable opportunities for people who started out only five years prior trying to fashion simplistic satellite TV systems out of thirty-year-old Bell telephone equipment discarded for its scrap value. The future of TVRO? Maybe it wouldn't be called TVRO at all . . . as our final chapter next suggests.

## FT/ FUTURE TVRO

(Isn't This DBS???)

### A MATTER OF Perspective . . .

Industry pundit Kenny Schaffer, writing in **CSD/2** magazine for August 15th, noted ". . . five foot dishes do not make for respectable TVRO. But, this is not TVRO, it is 'DBS' . . .".

DBS, like the early TVRO, has been confusing. It was said that all microwave transmissions were 'private' and not 'intended for broadcast reception'. The legal position has been that you cannot have 'DBS' for Direct Broadcast Satellite (reception or service) **unless** you have some 'formal, FCC, recognition' that the transmissions are 'legally intended for the public'.

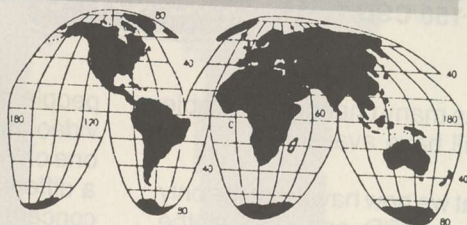
DBS, the Satellite Television Corporation (STC) or USCI 'DBS' is, or will be, operating in a frequency band

(by 1986 or 1987) which is, indeed, designated for 'direct broadcast service'. The early USCI DBS, launched in the fall of 1983 is 'FBS' or 'Fixed Broadcast Service'; it has, with some FCC blessing, used frequencies NOT designed for direct broadcast service. The early STC 'DBS' would also use a similar non-DBS portion of the spectrum. REAL direct broadcasting service, or DBS, will await the 1986-1987 time frame when STC becomes the first (as is now planned) to operate a service **within** the FCC allocated 'DBS Band'.

**There are many who believe that CBD or 'C Band Direct' is DBS;** that it is the same sort of service which DBS may one day become, only CBD is here NOW and



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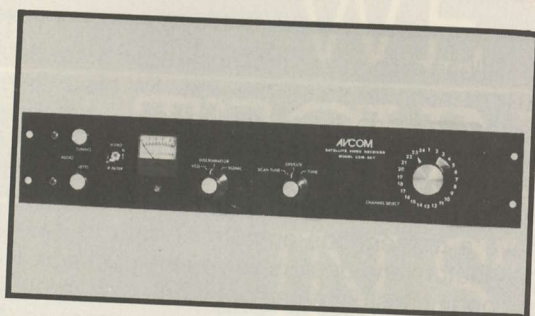
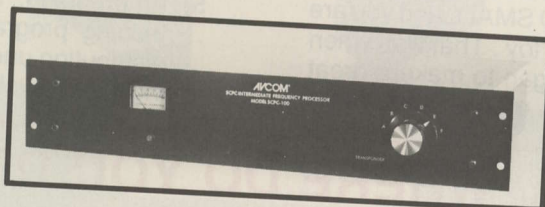


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# INTERNATIONAL SATELLITE RECEIVERS



it already has 20 to 30 times as many channels available as 1986-1987 STC 'DBS' will have available.

#### So what is DBS?

Some say that DBS is what we now have; that the only significant difference between CBD and DBS is the size (and cost) of the equipment. Now, suppose you could do something about the size, and cost, of the equipment?

His name is **Blair A. Gilbert**. He operates a firm in Kulpville, Pennsylvania called StarTrak Satellite Systems (\*). He began selling home TVROs in 1982 and entered the field fulltime in 1983. His firm is like many of the more progressive TVRO dealerships in America; he employs good people, selects good equipment, advertises heavily, and approaches his business with the experience that comes from being a graduate of Kansas State University with a degree in Accounting and Business Administration.

Once in the TVRO business, he quickly figured out that TVRO's number one engineering rule was "Any law relating to what is possible (or impossible) was written to be broken. . .". He read and he was told that 'any antenna smaller than 7 (6) (5) feet is TOO SMALL and you are just wasting your time with such a 'toy'. That was when the USCI early entry into DBS began to make a great deal of noise in his Philadelphia market. USCI was

people challenged by the thrill of still getting satellite video on a dish they can hold up in one hand. Gilbert is one of the first to approach the small dish 'problem' from a different perspective. His is from 'marketing' and his concern is that the final package be marketable, and installable, profitably, by the typical TVRO dealer.

When the system package was mature (more about that shortly), Gilbert's business sense told him that the best electronics and antenna package in the world would not succeed if there was no organized business plan to support it. To Gilbert, that meant a complete plan:

- 1) A complete consumer advertising and promotional program;
- 2) A detailed and accurate study of consumer wants and needs, and the consumer's willingness to 'pay for' such a package;
- 3) A manageable distribution program selling only to authorized distributors, each servicing a reasonable territory;
- 4) A backup service program for 24 hour repair or replacement of system hardware;
- 5) An on-going, 'mandatory' distributor and dealer training program to insure that both levels of distribution understood the finer nuances of selling 'CBD' systems.

## FUTURE TVROs/ WHERE DO YOU DRAW THE LINE WITH 'DBS'?

offering a **4 foot** antenna and a first year cost of from \$1,000 to \$1,500. He 'followed' USCI around and learned how they promoted, how they marketed, and how they closed their successful deals. He also discovered that there was virtually no consumer resistance to a four foot (diameter) dish on the house. This was an important revelation for Blair since so many of the homes in suburban Philadelphia are 'row homes' closely packed together with virtually no breathing room in between.

And he wondered just what might happen, at 'C Band', with a 4 foot dish. All of the experts told him to forget about it, but he wondered nonetheless and one day had the opportunity to haul to his shop a four foot, .3 f/D aluminum dish of exceptionally fine construction.

That was one year ago. In that interim Gilbert and his associates have created **Galaxy Broadcast Satellite (GBS)**, a firm that has zeroed in on the never-never land of ultra-small dishes for C band direct satellite service. Their approach has been unorthodox and their results to date instructive.

Most 'smaller and smaller' antenna systems have been the products of engineers or quasi-engineers;

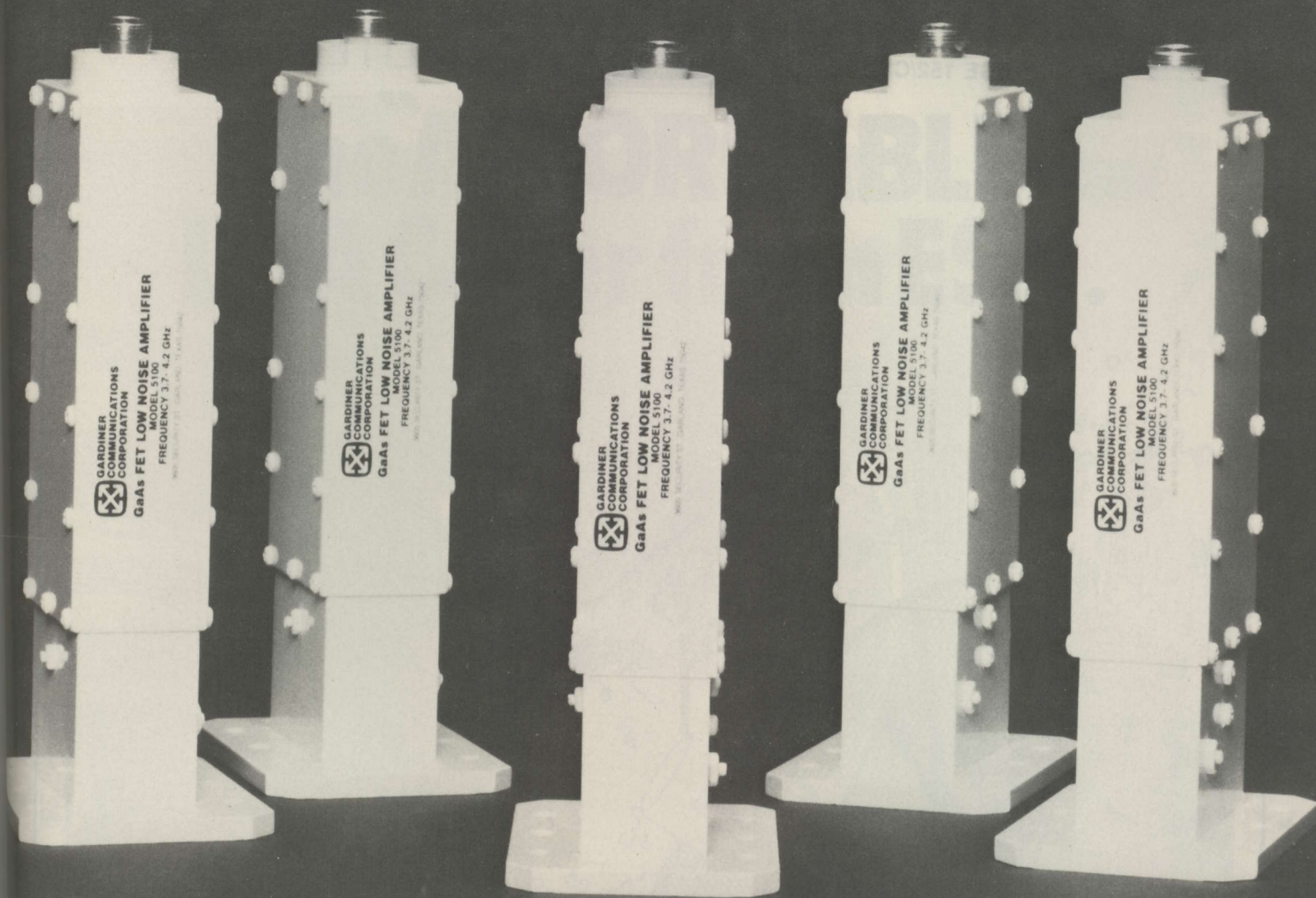
Gilbert recognized that he needed more data, that to build a national sales program for his refined 4 foot system package, he needed to know what the practical field problems were going to be. He also knew that if he could pinpoint his 'target' audience, help define who made up the market for small CBD systems, he would have a tremendous amount of data to pass along to distributors and dealers selling the package. His idea of supporting his ultimate dealer network, through his distributors, was to lay out an **entire program** for them; starting, of course, with refined equipment packages, but ending with proven techniques for installation and financing for the packages.

Going back through his computer files, he located more than 1,000 'sales leads'; people who had contacted his firm concerning the larger C band TVRO systems, but who did not purchase; for whatever reason. He wanted to find out if a 'CBD' 4 foot package might change their minds.

Did they **not buy** because the system was using an antenna that the consumer considered ungainly and large? Did the customer **resist** because of the cost? Perhaps the customer decided **against buying** because of the complex steps involved in operating the equipment? Blair intended to find out and he fashioned a direct mail plus telephone follow-up campaign to con-

\*/ Blair A. Gilbert, StarTrak Satellite Systems/GBS, Lamplighter Plaza, O.B. Box 349, Kulpville, Pa. 19443; 215/368-2800.





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GBS by Gilbert/ 4 foot 'GBS' antenna package, to .002" tolerances, bolts to user roof with six lag screws and assemblies with four bolts. Total installation time per system; one hour for two men. Suggested retail pricing; \$1,495 installed.

tact a large portion of those '1,000 negative sales leads'.

As the marketing test results came back, his staff analyzed who the respondents were and they compiled a set of demographics. Here is what they found:

The typical **non-buying** customer was:

- 1) Age: Mean age of **49**, with a low of 30 and a high of 68
- 2) Marital status: 82% were married
- 3) Income Level: Mean income level was **\$37,500** with a low of \$15,000 and a high of \$60,000
- 4) Years At Job: Mean was **13.5 years** with a low of 2 years and a high of 25 years
- 5) Housing: 81% of those responding owned their own homes
- 6) Years At Address: The mean was **14.5 years** with a low of 1 year and a high of 28 years
- 7) Area: 45% lived in a city area, 40% lived in the suburbs while 15% lived in 'the country'
- 8) Occupation: 48% were self-classified as blue

collar; 23% as white collar, 15% were retired and 14% were professional (or self employed).

Now, what did all of this mean and how would GBS use this data to test their new 4 foot CBD system?

Gilbert and the GBS crew elected to produce **fifty of the small four foot aluminum dish systems**. This involved the dish proper, a GBS designed tripod mount for the feed, a rooftop or side-of-roof mount for the dish proper (Az/EI; fixed), a modified Polarotor feed (remember the .3 f/D of the dish), and a newly designed low noise block down conversion (LNBC) electronics package for the antenna. Inside, a UHF range fully tuneable BDC receiver with tuneable audio.

Here is the offer GBS made to the 50 demographically selected homes where the first 50 systems would ultimately be installed and tested:

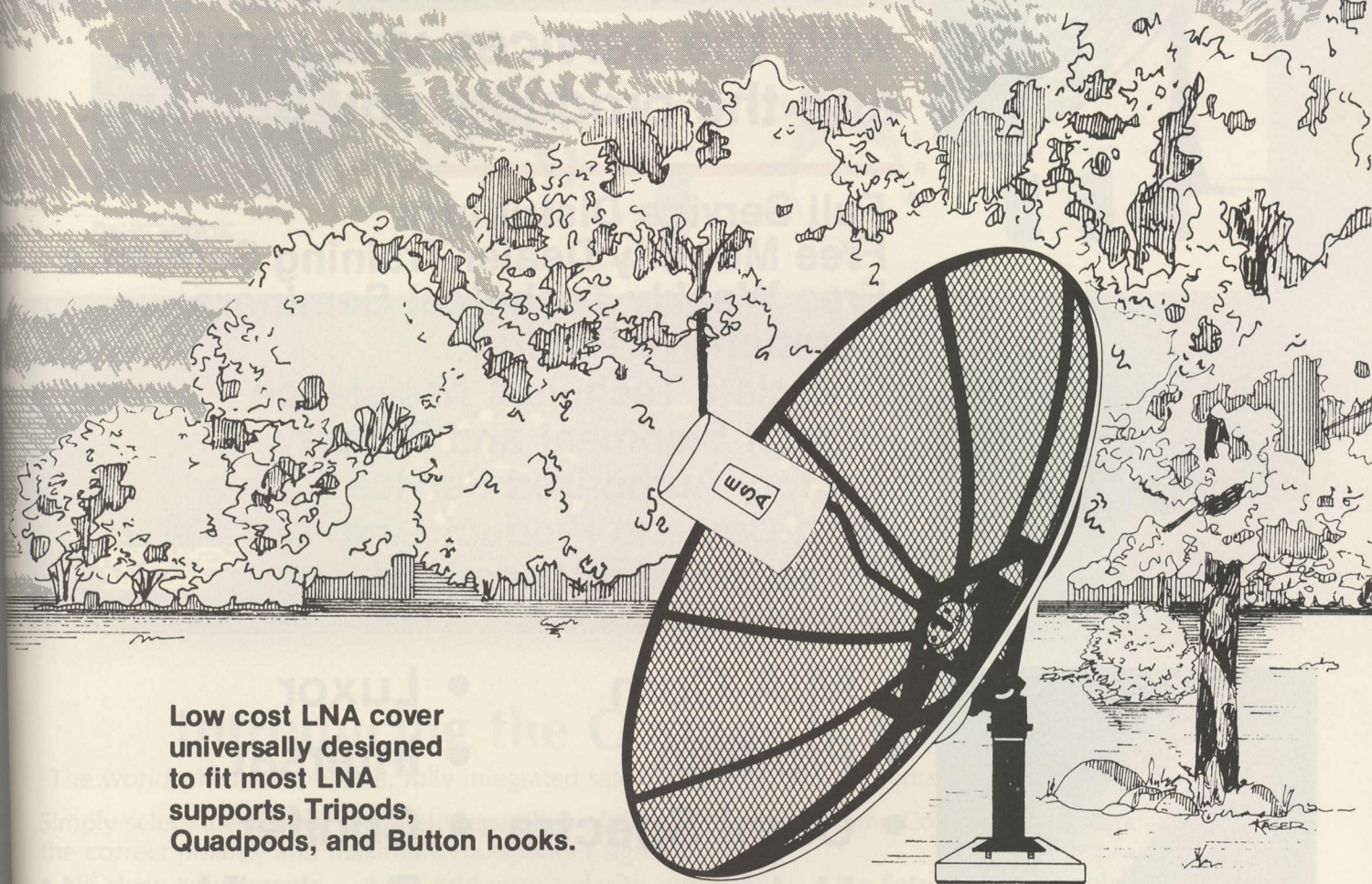
- 1) GBS would install a system for the customer and the customer would be participating in a 'market

ISN'T THIS DBS?/ continues on page 156



# **NOW!**

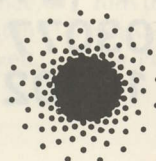
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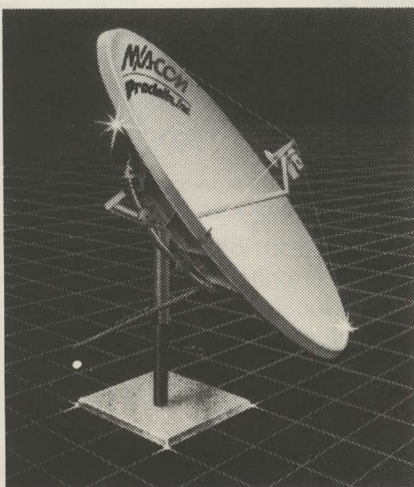
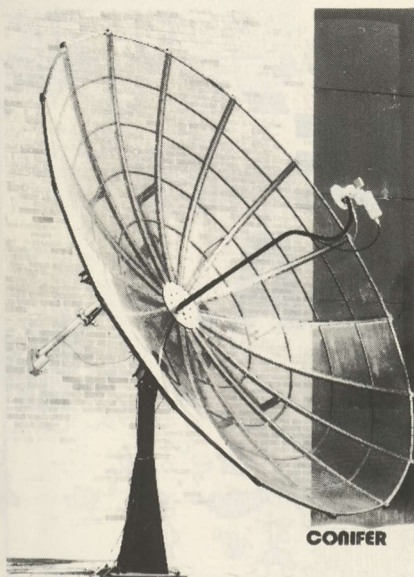
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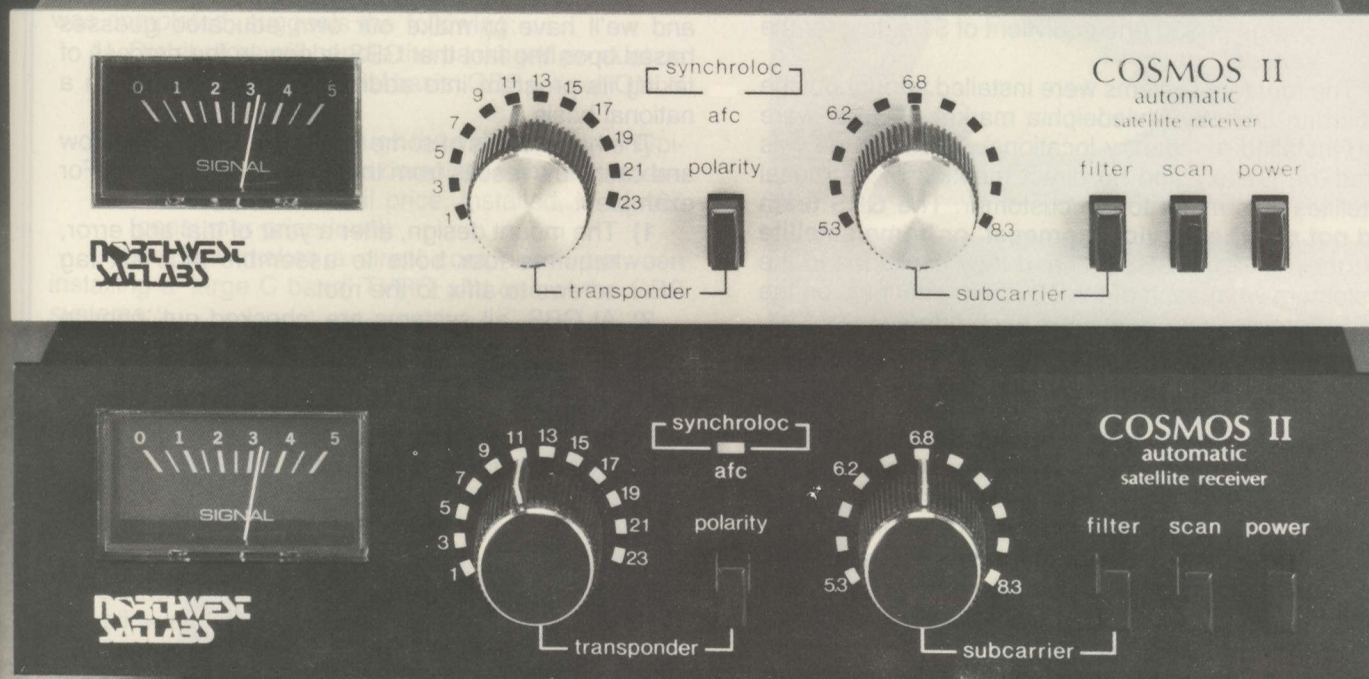
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ISN'T THIS DBS?/ continued from page 152

trial'.

- 2) The customer had to **agree** to answer a series of questions concerning their use of the system, their likes and their dis-likes with both the system and the programming.
- 3) The typical trial would be for '30 days' (although some have lasted longer) and there would be a charge of \$30 (the equivalent of \$1 a day) for the service.

The four foot systems were installed throughout the suburban and city Philadelphia market. Several were also installed at 'country locations'. The antenna was 'fixed' on Galaxy and no direct mention of additional satellites was made to the customer. **The GBS team did not call the service 'homesat' or home satellite TV;** they called it 'GBS TV' and they explained to the customers what each of the 18 (then) channels on the 'GBS Satellite' were and what each offered.

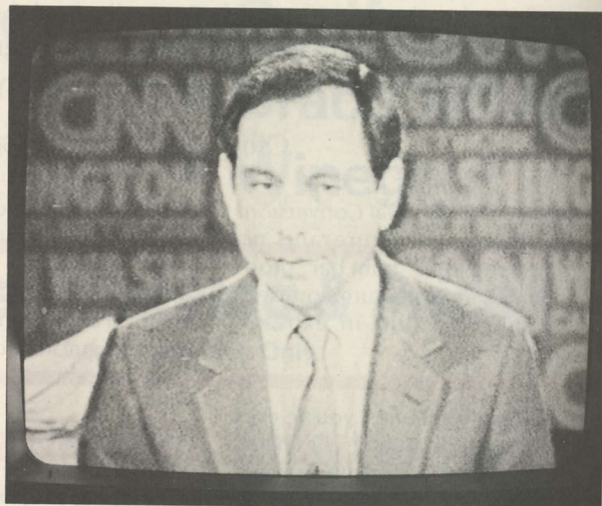
At the end of the trial period, the customer had 3 choices; they could ask GBS to take the equipment away and they were under no further obligation. They could purchase the system, as it sat on their rooftops, for \$1199. Or, they could sign a 48 month lease on the system for \$30 per month (\$1,440). Gilbert reports he attempted to mix the 'low' and 'high' demographics his initial study revealed with the 50 homes finally selected for the tests; with one exception. He was optimistic that after the test a substantial percentage of the test homes would find the 'GBS Service' so attractive that they would keep it. He also anticipated that the majority of

those retaining the systems would opt for the 48 month 'lease package'. With that in mind, he admits that in the final analysis, his people selected 50 locations which were occupied by people with credit ratings which would stand the \$30 per month for 48 month contracts.

You would expect and probably hope that this paragraph would tell you how well the program went. Gilbert considers those results 'proprietary' at the present time and we'll have to make our own educated guesses based upon the fact that GBS is now in the process of taking its program into additional, new markets on a national basis.

The hardware is of some interest, as is the time flow and cash flow results from the first 50 installations. For example:

- 1) The mount design, after a year of trial and error, requires four bolts to assemble plus six lag screws to affix to the roof.
- 2) At GBS, all systems are 'checked out' prior to



**GBS RECEPTION** on four foot dish may not be network 'studio quality' but Gilbert's 50 test homes rated it between 'Good' and 'Excellent'. "18 new channels of highly diversified television for \$1 a day is not a bad marketing value today" **points out Gilbert.**



sending a crew out for the install. The only 'variable, from one installation to another, is the length of the interconnecting cable carrying the LNBC signal to the indoor receiver.

- 3) The complete GBS system, in a shipping carton ready for distribution, weighs 47 pounds.

The marketing concept GBS has in mind, set into motion after the initial '50 home test market' program was completed, suggests the following:

- 1) Distributors will handle the packaged product on an exclusive, territorial basis; GBS will sell ONLY to its distributors.
- 2) Dealers, buying through the distributors, will typically pay \$985 for the complete terminal system. The suggested retail price, installed, is \$1,495 (consumer price level).

Gilbert now makes a direct comparison between installing a 'large C band' TVRO and one of the GBS systems:

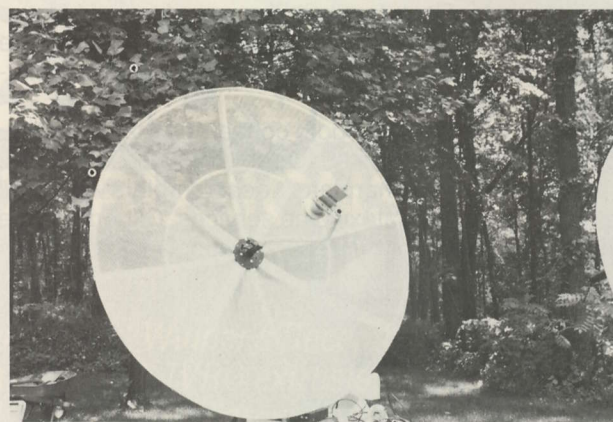
- 1) The typical 10 or 12 foot antenna system, he believes, requires 10 to 14 man hours plus travel time, often spread over two full days (to allow for base 'set-up');
- 2) Based upon the 50 test system installs, GBS systems average 'one hour each' (plus travel time).

This leads him to suggest "If the marketing people can create the leads and the sales, an installation crew with allowable travel time should be able to handle no less than three full installations per day. If the dealer is profiting approximately \$500 per installation, his yield per two-man work-day is \$500 X 3 or \$1,500 per two-man crew. And these are 'no-hassle' installs where every installation is like every other installation. After allowing for install time and overhead, and marketing costs, the dealer should net between \$250 and \$300 per installation. And that is \$750 to \$900 per two-man crew per day. I think it is a good trade!"

Those are the 'highlights' of Gilbert's GBS program. It suggests that unlike past attempts to package and promote small dish antenna systems, which have been approached by people with engineering backgrounds, this one may have a considerable impact on the way we do business.

Gilbert, while perhaps on the leading edge of marketing 'CBD' systems, is hardly alone. There are many firms out there offering 'small antennas' and a few are even offering 'small antenna/system PACKAGES'.

**MPI Satellite, Inc.** (operated by industry veteran Peter Sutro) is one and we'll look at Sutro's progress shortly. Others include **Satellite Distributors** (Shawnee Mission, Kn.; \$699 4 foot system, including crating charge, using a 120 degree LNA but less a polarizer device), **Alpha Ra Corporation** (Sacramento, Ca.) offers a 4 foot plastic dish without mount and feed for \$145 in 50 lots, **All-American Satellite** (Dallas, Tx. Galaxy-4000 4' dish in single lot price of \$189), **E.T. Carolina** (Greenwood, S.C. Little Giant', 4'8" dish with buttonhook feed and mount for \$275 in singles) and the



SUTRO/MPI five foot screen mesh antenna tested by Taylor Howard had efficiency measured in 70-76% region and a G/T of 14.9 when equipped with a 60 degree LNA. Sutro believes an antenna like this, equipped with a dual mode or orthocoupler feed could provide 'headend' service for a 'garden apartment' complex of hundreds of units.

well promoted 'New Quad' 4'10" dish.

Gilbert's approach has been to optimize the complete system, to eliminate the need for dealer 'trial and error'. "We have elected to use an 85 degree LNBC and to optimize the feed by working closely with Chaparral" he notes.

Chaparral's on-going OEM assistance program figures prominently in another project in the same 'CBD' area. The entrepreneur behind this one is Peter Sutro, well known in the industry for his anticipation of new marketing directions.

Sutro has been backing a new five foot mesh surface antenna designed by a young duo in New Jersey. The antenna recently completed 'antenna range measurements' at Chaparral where Taylor Howard had these comments:

"The pattern plot of the antenna is extremely clean and symmetrical with low side lobes. Of the two antennas tested (Note: one was a .3 f/D while the other was .5 f/D), the .3 antenna outperforms the flatter one when it comes to G/T. This is the important number, for, unlike gain, G/T eventually becomes C/N (carrier to noise).



"Some of the older literature suggests that the noise behavior of smaller antennas is considerably worse than that of larger ones. Plots of the .3 f/D 5 footer versus plots of a .3 10 footer suggest this is NOT the case. People who still read the older publications may well continue this myth for sometime, however."

Sutro's thrust is towards mini or micro SMATV systems; an inhabitant of a region where 'garden apartments' are the norm, and where population densities are high, he has recognized a 'market segment' that he feels cannot be served with the present generation of mature TVRO systems.

"One antenna, one SMALL antenna, may be all that can be fitted in for several dozen living units. That antenna would be dedicated to Galaxy and its 'DBS' programming package. Each family in the complex would have electronic access to that antenna and each will have independent access to any transponder, on either polarization, on that satellite."

Gilbert and Sutro are both concerned that any packaging for 'CBD' systems be capable of being retrofitted, at a later date, to the mandatory descramblers which will be required for the Galaxy One services. Gilbert has the written assurance of his receiver supplier that the re-

ceivers he has selected can handle an outboard **VideoCipher** type of descrambler. Sutro is not so sure that ANY receiver supplier really knows what to anticipate in the VideoCipher descrambler interfacing yet.

"It bothers me that low-cost, BDC receivers may be the one type of present private terminal receiver which are least apt to be capable of handling the stringent requirements of VideoCipher. My own marketing research tells me that if the garden apartment complex packaging is going to work, we have to be able to walk into a potential customer with a receiver that costs us no more than \$300 to \$350 each" says Sutro. "A receiver in this price class has already made several engineering and performance compromises and I worry that those are the compromises which VideoCipher likes the least".

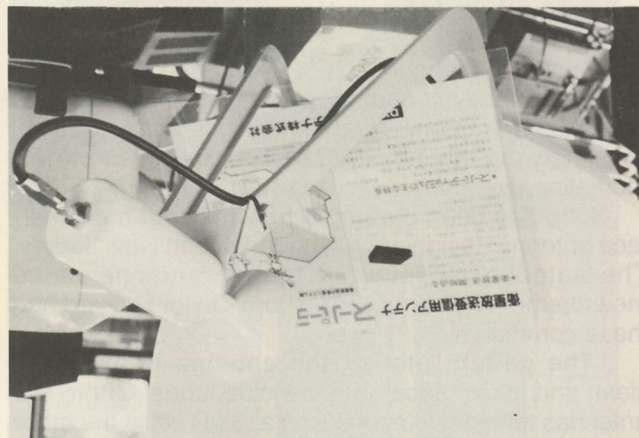
Gilbert's approach is that each user of (GBS) CBD will have their own antenna. That makes the 'any channel access' problem less complicated since each home or user will have their own polarization control. Sutro feels the market is far larger when you think in terms of **one antenna being shared** by many homes or living units. That immediately presents a new problem; how do you give each home independent access to both horizontal and vertical signals?

"I think there may be a compromise here" he suggests. "Maybe a high quality four foot antenna is adequate for a single receiver; you will probably have to go to a five or even six foot antenna for multiple families; and figure out some type of orthomode coupler system to give people separate selection of both horizontal and vertical signals." That says two LNAs and two 'master down converters' at the 'shared antenna/headend'. It also says two separate runs of RG6/U distribution cable and a switch in each living unit for selection of the vertical and horizontal signals.

"**Maybe; all of the research is not back yet.** I think there is a way to do it on **one cable** and if we can do it on one cable, we are going to be far better off. Remember, people are used to, and expect, to turn just one 'knob' to change channels. The user should not have to learn a new technology just to watch satellite TV."


Sutro's glimmer of hope, for a single cable, is based upon a technology created first in Europe where early users of 12 GHz service have faced a similar problem. In Europe the present day 12 GHz transmissions are spread, or will be spread, over two different 'bands'; the FBS band and the DBS band. The sum of those two bands, in width, is equal to the rough equivalent of one vertical band PLUS one horizontal band of channels in North America. The European solution, elegant in application, is to stack the two bands in the IF. Sutro hopes a similar approach will evolve in North America.

How would this work? One downconverter, tuned to say the vertical channels, would send them through the distribution cable in perhaps the 300-800 MHz region. The second downconverter, tuned to the horizontal channels, would stack the second channel set from 800 to 1300 MHz. The user would have 24 channel con-



**OFFSET FEEDS**, common at 12 GHz, may hold some promise for small 4 GHz antenna system designers as well. Several firms are presently involved in developmental work in this area and within 12 months we should know what promise this holds.





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**ARTHUR C. CLARKE**/ at home in Sri Lanka views a videotape re-run of a Clarke Special television program created by the BBC. On top of the television set; the 'Marconi Award' given to him two years ago in recognition of his creation of 'satellites' and the Clarke Belt.

tinuous tuning with 1, 3, 5 and so on up to 23 and then it would switch to the 2, 4, 6 set as the tuner went through the 800 MHz cross over point.

"Alas, that particular receiver configuration does not yet exist" points out Sutro "and until it does, the one-cable, any channel, independent selection technique is just a dream."

Pundit Schaffer points out that this 'type' of system probably makes many people in the present day C band business nervous. "The purists, the guys who want to see 50 dB signal to noise ratios and unbleached color on every channel on every satellite, throw up when you talk about this type of 'DBS'. They don't want to **even consider** such a marketplace. That makes it difficult to get the engineering support needed to create the hardware needed for such an approach since most of the engineers are purists themselves. I consider myself a purist, but someplace in here there has to be a realist as well. I agree with Sutro; for every home we have reached to date with stand alone 8 or 10 foot antennas, there are a dozen homes waiting for us where **ONLY** this type of service approach will sell."

Sutro, typically ahead of his time, has already been to HBO with his plan. HBO, heavily involved in their own

planning for a 'CBD' service to **individual** homes, has shown little interest in what he proposes to date. "HBO thought I was talking about small, traditional cable, at first" recalls Sutro. "They told me to go and talk with their SMATV people. When I finally made them understand that I was really outlining a totally new service that just happened to feature shared use of a common TVRO antenna, they threw up their hands and said 'This sounds like an entire new (HBO sales) division to us'. They told me to go away and come back when they had individual terminal system plans sorted out."

Schaffer offers this advice to those who remain on the purist side of the fence. "If you are having difficulty accepting this approach as a valid extension of 'TVRO' technology, then don't call it TVRO; call it DBS. If your concept of TVRO involves having independent access at every receiver to every satellite and every channel in the sky, shift mental gears and forget all about TVRO. **This isn't TVRO at all; it is C band DBS.** Pretend this is an entirely new business created to accept an entirely new generation of satellite television user, and market. Maybe the people who are trying to make something of this would be far better off if they adopted the attitudes of Howard and Coleman and Cooper of 1979; this is a



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NEW engineering problem demanding new engineering solutions. We will be spinning our wheels and slowing down progress for months and years as long as we continue to attempt to make such a system work by simply adapting from standard TVRO equipment. A fresh, new approach is required to make this work and the sooner we realize this, the sooner we will be wiring thousands of garden apartments per week with satellite television. If we, in the home TVRO industry, don't accept this challenge, somebody else will. And that's what we need least right now; an entirely new industrial base or group out there in the marketplace offering a service which falls someplace between the over-hyped

12 GHz 'DBS' and the present C band home TVRO. It's time for **us** to get our act together!"

**Arthur C. Clarke** would appreciate Schaffer's direction. His own mind works in similar ways and he has always envisioned the satellite belt, now named for him (Clarke Orbit Belt), as a provider of a multitude of services for what would ultimately be **every** man, woman and child on earth. Clarke has championed that concept for several decades; since the 'newness' of the satellite concept began to wear thin in his own mind. To paraphrase a Clarke statement of some years ago, "**What you call it is not important; what it does is what counts.**"

## TVRO & CSD/ OUR SIXTH YEAR!

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#### ORIENTAL Intrigue/Two

I can easily identify with the kind of problem Anderson (Scientific) has been having with their Korean manufacturing representative (see CSD for July 01 ; Ed.). That is because their story, with a few minor 'cast changes', and a slight change in location (Hong Kong rather than Korea) could very well be 'our story' as well. It happened something like this.

About a year and a half ago, we were approached by a 'major far eastern electronics' manufacturing firm that said they wanted to get into the TVRO business. Tired of the limited product and poor performance from so many of the Canadian and US firms, we thought it might be a good idea to expand out of our primary business (antennas) into the electronics side. Most of all, we would not be paying any import duties (all US manufactured product coming into Canada carries a 12% import duty while Hong Kong goods are duty free here). The import duty alone could amount to \$50 per receiver.

The firm sent over their representatives and we had numerous meetings. One of the recurring themes with these 'honourable Oriental trading partners' was their continual (although seemingly unnecessary) extolment of how principled they were.

Our meetings took place at various locations (including the US, Hong Kong and Canada) and our people put together a number of prototypes as well as the other technical information so that we could, in our opinion, create what we felt would be a good quality but low-cost product. Typical decisions would be 'Stereo? It only costs a few dollars more! Why not.'

They sent us a prototype, a price and production schedule that met with our approval and we went home rubbing our hands with enthusiasm, confident that we would have a 'killer' in our hands very shortly. I guess the first indication that something was not 'kosher' came at the Las Vegas CES this past January. There, to our complete surprise and utter amazement we found 'our receiver' being displayed in the company's private reception area, with colour literature being generously handed about to anyone who asked.

I asked! 'Oh, no problem, sir. Only something our aut depwatmen put together. **You still have esquiseive on this pproduct!**'

We would subsequently learn the translation of 'esquiseive' in Hong Kong-English. It means, simply stated, that the unit you have contracted for will have a distinctive FRONT PANEL! They will not sell **your front panel** version of the receiver to anyone else. But everything else that is there (downconverter, receiver chassis, the rear receiver panel and connectors/options, and of course the full 'guts' to the receiver) . . . well, that is not part of the 'esquiseive'.

The next thing we knew, a 'major TVRO player' was beginning to advertise THEIR sensational, new, receiver. It had a striking resemblance to our own. A call to the owner of this company cleared up things for me. That's when the meaning of 'esquiseive' became even clearer to me.

He told me his company had been approached with a receiver, by our 'Oriental trading partners' which they said THEY designed. No mention was ever made of anyone else being involved, and furthermore, he told me, he had signed them to an EXCLUSIVE agreement which prevented them from marketing any 'similar' product to any other TVRO suppliers. That of course included us.

Now I understood why, after four months of promises, we had never been able to get the long promised pre-production models for final approval and the start of marketing. The answers we received were interesting; typical was 'so solly, pwarts so har to find these days' or 'so solly, we missed pproduction window this month!'

Like almost everything else in life, it boils down to bucks. It is now clear to me that these guys were simply sucking us for information. They lacked the ability, as is often the case of many of these loft-type Oriental production houses (in Korea, Taiwan and Hong Kong) to do any original or 'assembled' design work. We provided that, willingly, because we wanted the best technology to be in 'our product'. We had that ability; we lacked the ability to get it into production. When we reached the stage for approving the final pre-production models we



placed an initial order for 1,200 per month. Remember, we build antennas, not receivers, and I had to be able to swim back out of this if the water got too deep. The 'major player', already deeply into TVRO receiver distribution, had his lines of distribution established. He sprung for 9,000 per month and so of course 'his bucks' were far more than 'my bucks' and I got left in a pail of Pork Fu Yung while he got the receiver **we designed**.

We knew we were taking a calculated risk right from the start. I must admit various other people who deal or have dealt in the Far East had warned me. I'm a big boy and I am not crying over spilled rice. But these are clever people and it was soon apparent to me that signed agreements are worthless if you don't have an international legal staff to check things at **both ends** and the big bucks to pursue legal recourse in Hong Kong (or elsewhere, there). If they want to get around you, or 'dump you', they could and would and that leaves you as a short term player dedicated to 'selling the hell out of the product' for those few, short months when they may decide that your horse is the fastest one in the race.

Sooner or later they **will** change horses. Ask Anderson, or go back through your old CSDs and find the Peter Cook ads ('Our Compliments To The Cook', and 'What's Cooking?'). The Cook receiver **was seen** at a few shows with great form; but he only got a few proto-types over here before he was strung out so far that bankruptcy was the only path remaining.

I have also heard numerous stories involving US would-be entrepreneurs dumping big bucks into Oriental R and D; people who were actually suckered into believing this crowd can design anything from scratch! Come on now; if they can't copy something somebody with real talent designed, how in the name of 'The Boat People' do you think they are going to create from a raw circuit board? Please, be warned; don't EVER invest even a dime in some scheme to **design** a TVRO receiver in the Far East. All you are doing is funding somebody's expensive, First-Class airline trips back and forth.

To be as fair as possible, there are always two sides to any story and we are all somewhat to blame for this one. On one hand, we sit

across the dinner table painting our glowing stories of a shimmering industry that is either (selling), (about to sell; pick your own level of hype) 'millions and millions' of these things. And these guys come to us having read the hype put out by the DBS guys and they actually believe that DBS is already here (isn't HBO about to launch **C Band DBS**?). All of this hodge-podge of information gets lapped up like a cat placed before his first saucer of milk in a month. Can you imagine what their 'cables' back home say after sitting down to dinner with one of our high-rolling receiver 'magnates'? A one or two or three thousand production run is big time stuff to most of **us** per month. We should keep in mind that they run assembly lines that change products daily or twice daily; transistor AM radios in the morning, hand held TV controls in the afternoon, radio controlled model cars in the evening shift. They can whip through the 'assembly' part of a couple of thou of our units in a day or two. We are just another commodity to be shuffled down the line in front of those hundreds of blue clad, uniformed ladies with flying fingers and mechanical parts insertion.

Let's face it; most of us, and I include myself in this analogy, are 'hicks' when it comes to the 'real world' of high quality, high class, mass production. When (perhaps if) somebody with credentials finally gets their act together, we are going to be spinning like a top and wondering what hit us! Anyone who has toured an automobile assembly plant, recently, will recognize what I am talking about. While we are still trying to stick a welding rod in some guy's hand, they are the ones already in the 20th century of Arthur C. Clarke with computer operated parts insertion, robotic board movement (also computer controlled) and highly trained and highly dedicated workers who actually concentrate on their work rather than pondering their next union contract wage hike.

The way I see it happening, there is very little difference, twelve months down the road, between those CB sets they crank out and land in North America for \$20 to \$30 each, and the 70 MHz input TVRO receivers we demand for our industry. Except the TVRO receiver has not **yet** attained the synthesized click stop tuning that the CB sets have or the quantity of 'bells and whistles' you find on the typical

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CB radios.

The next 12 months will be crucial. People building TVRO receivers using the same kind of tuning my old man had on his crystal set and using the modern day equivalent of a guy trained to burn up welding rods all day long performing one assembly task are doomed. There's a real world out there and it is not centered in Arkansas. Wake up Virginia before it is too late!

David Brough  
Commander Satellite Systems  
Mississauga, Ontario  
Canada

We wrote in the July 01 CSD (as noted) about a series of unfortunate events that transpired between US TVRO OEM Anderson Scientific and a Korean firm that contracted with Anderson to supply additional production capacity to Anderson for their BDC design receiver. In our September 01 CSD, writing about the growth and growing pains of Ramsey Electronics (Sat-Tec), we reported John Ramsey's observations of wholesale pirating of Drake (and other) US designed TVRO gear in Taiwan. Brough now extends that scenario to Hong Kong as well. The truth is obvious and not difficult to understand. Mass production of electronics is far more advanced outside of the US than within. Firms headquartered in the Far East specialize (Japan excepted) in building exact copies. They can and will copy anything laid before them. They do not specialize in understanding what they are copying; if there is something unusual in the original (such as an etched inductor microwave line on a circuit board) that has exceedingly precise tolerances, the importance of the length, width, placement and surrounding parts to that etched line will not be understood by the 'copy-cat-pirates'. When they 'crank-up', they turn out thousands of the 'exact duplicates' faster than you can say Sand Pan. That means there are thousands of the units, all with the same mistake built-in. Only nobody discovers the mistake until they make their way to North America in those slightly-off-colored light brown cardboard containers. Japanese firms innovate (witness Uniden) but everyone else over there, to date, copies. When some of the others (Taiwan will probably be first) figure out how to design (innovate) as well, there will be a rapid change in the marketplace. When you combine their exceedingly low labor rates, their shrewdness and innovation, we'll see \$30 landed (wholesale of course) 70 MHz input receivers that work as well, and as dependably, as a finely tuned Sony or Panasonic VCR. Brough apparently gives us another year before that happens. We're less optimistic than that and would be cautious about 'Arkansas TVRO receiver futures' more than 90 days in advance at a time!

#### COMES Now UL

With the proliferation of satellite equipment and its widespread use in both household and commercial applications, the concern for safety has increased. This is evidenced by recent inquiries from electrical inspection agencies, government agencies, fire officials, insurance firms and retailers.

We want the TVRO industry to know that we have developed requirements to be included in the **Standard for Low-Voltage Video Products Without CRT Displays**; UL 1409 covers these products.

We have also established a new product category called 'Microwave (and cable) Communication Equipment,' and we are hereby announcing our willingness to accept product submittals or system components in this category. This product category includes microwave and cable TV receiving and processing 'appliances' and accessories intended for household or commercial use. Covered are the following satellite, microwave and cable TV units.

Power supplies, signal amplifiers, **downconverters**, decoders, descramblers, interconnection cables, user communication devices for interactive cable systems (terminals and signaling devices), communication antennas **including microwave receiving** and transmitting antennas, antenna rotating systems (**azimuth and elevation positioning**), antenna **motor controllers** and **polarization** devices, antenna mounting/support hardware, **microwave receivers**, upconverters, low-noise amplifiers (**LNAs**), demodulators, multiplexers, high-powered amplifiers, converters and coaxial relays.

Those (manufacturers) wishing to submit products of these types to UL for investigation with a view towards obtaining an (approved) listing should direct their inquiries to: Mr. C.S. Jones or Mr. M.J. Winrich at UL's Melville office (1285 Walt Whitman Rd., Melville, NY 11747; 516/271-6200), or, to Mr. S.W. Coen at UL's Northbrook office (333 Pfingsten Road, Northbrook, IL 60062; 312/272-8800), or, to Mr. K. Ravo at UL's Santa Clara office (1655 Scott Blvd., Santa Clara, Ca. 95050; 408/985-2400).

Marvin J. Winrich  
Senior Project Engineer  
Electrical Department  
1285 Walt Whitman Road  
Melville, New York 11747

UL or Underwriter Laboratories Inc. is a not-for-profit group formed decades ago to help clean up nasty losses being incurred by insurance firms. In particular, electrical appliances first sold in the 20's and 30's (and into the 40's) were notoriously poor safety risks. Insurance firms paid handsomely because people stuck cloth wrapped AC line cords on irons and toasters and users had mishaps that often resulted in tremendous fire losses. This prompted the insurance firms to band together to create a joint-use lab which ultimately would test and approve (or recommend changes before approving) virtually every household appliance sold in America. Now, like it or not a TVRO system is rapidly becoming 'just another electrical appliance.' So far, knock on a Jim Vines dish, there has not been an unusually high percentage of fires or accidents involving TVRO dish 'appliances.' Wisely, however, the insurers recognize that as TVRO grows, there will be those who will be tempted to trim 6 cents off of a receiver by sticking on a non-approved power cord or creating a non-fuse protected controller. They want to be prepared and are asking for voluntary support. Manufacturers will do well to talk with them about getting their own products approved. Look at it this way; if they don't like what they test, they will tell YOU where the weak points are. You will pay a fee (although not a huge fee) to get your equipment tested. If it fails to pass the first go around, write off the initial fee as an 'R and D' expense, make the changes their engineers suggest, and then resubmit the modified product. Paying \$1800 twice for a double product submission is far cheaper than paying a \$250,000 court mandated settlement because something you built 'broke' and cost an end user to lose a valuable piece of property, or real estate; or, a 'hand.' UL certification requirements are inevitable as TVRO systems proliferate and we will gain nothing but the wrath of the major insurance carriers by fighting this one. Be the first in your product category to be able to claim 'UL approved'; it's good business.

#### TRUE SCALAR Grit

Before CSD statements concerning the origin of the Chaparral (scalar) feeds become carved in any more stones I would like to set the record straight. Steve Birkill and I have discussed the matter and are in agreement that **neither he nor I** invented or originated the scalar plate or that aspect of the feeds; and that we did not copy anyone. The design was available in open literature at least 15 years prior to Steve's publication in **CATJ** for February of 1979.

The name 'Scalar' was coined in the early 1960's by a gentleman named Alan F. Kay. He not only named but he also invented this 'class' of feed. A copy of one of his published articles is enclosed for your amusement.

Many Scalar (family or type) feeds were developed in the mid-60's and 70's by many people; including your's truly. They were generally done for radio and radar astronomy applications; the 'calm sort of thing I did professionally before Cooper sucked me into this madness!'

Steve's feed, published in **CATJ** for February 1979, worked reasonably well although, as he admitted in **CATJ**, he did not possess the equipment to actually measure the patterns. This does not belittle his contribution; to the contrary, he had the foresight to know that (such) higher technology feed horns would be needed in the 'low noise' TVRO world of the future. In fact, Steve's vision, as expressed in his numerous writings, had inspired me and countless thousands of others in everything related to TVRO.



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The Chaparral feeds were an outgrowth of the earlier work and were the result of a very detailed design, pattern, and impedance measurement program. They work well because they were done right; both electrically (my contribution) and mechanically (the contribution of the engineering genius of Chaparral's founder; Bob Taggart).

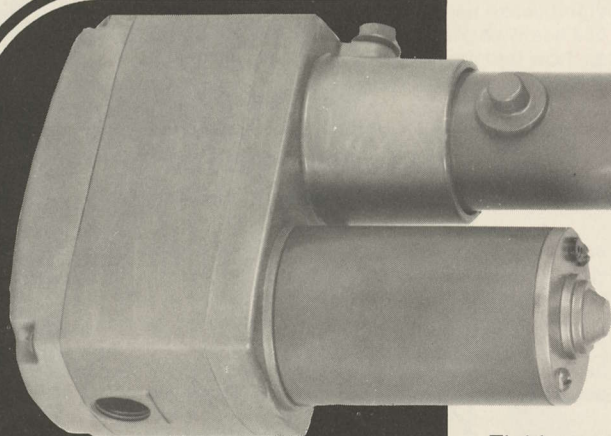
Some of the earlier work, dating in the 1966 era and again in 1972 and 1976, is detailed in an enclosed article, in German, from a European technical publication. It is interesting to note that while work was being done in the Scalar feed family area nearly 20 years ago, it has only been during the past couple of years that a detailed understanding of **how** such a feed works has come about. This in turn has made it possible to unlock the last few percentage points of efficiency from a feed.

Chaparral is dedicated to getting the last fractional dB of performance out of every (TVRO) manufacturer's antenna. We have an active and on-going program to assist antenna manufacturers with that quest. This has become increasingly important now that truly low noise LNAs have become plentiful at reasonable prices; it is no longer just antenna 'gain' that counts. When you reach a certain point of gain, the trade off between maximum gain AND minimum noise becomes exceedingly important. The best carrier-to-noise ratio becomes the objective; not necessarily the greatest amount of raw gain.

Such performance does not come cheaply. It requires expensive facilities and continuous research and development. It does not come from the 'imitators' because they have not the slightest idea **what** they are doing **or why it is done**. They will always be a 'generation' behind. And it does not come from the cost-cutters who live only for today without realizing that their future success really depends on the continued creation of new improvements and developments.

H. Taylor Howard  
Director of Research  
Chaparral Communications  
2360 Bering Drive  
San Jose, California 95131

**Piracy of any product is short-sighted. A pirate can always copy something and sell it for less than a creator because he has no time nor expense in the creation itself. Anyone who knowingly buys a pirated product is contributing to the eventual erosion of that portion of 'profit' which the creator needs to offset his original development costs, or, needs to pay for further refinements of the product (i.e. the next generation). A pirated copy of anything, including a TVRO feed system, may save you a few bucks today but think about what it may cost you tomorrow. If piracy becomes the norm, pretty soon all innovation slows down or stops. If innovation in a \$60 feed can allow a dealer to trim 10 or 15% off of the required dish size, the dealer benefits substantially by being able to sell a better total system using a smaller antenna for less money. The \$10 or \$20 difference between an 'original' and a 'pirated copy' is far less to 'save' than will be 'lost' if the feed people are forced to stop their R and D because piracy losses cost them that few extra dollars in profit they must have to keep R and D going. Piracy has no place in an industry that is attempting to build a solid foundation for future stability. As for the 'creator' of Scalar feeds, Professor Howard is somewhat modest. The Birkill design was created as perhaps one of the first working model scalars with a flat plate for 4 GHz service. But it was, as Birkill himself says, largely 'empirical' in design. In other words, he did his calculations on paper and then built his unit. It was Howard's wisdom which recognized that the flat plate design had merit, but only if it was 'optimized' for maximum performance (highest gain plus lowest noise pick-up). It was also Howard's efforts which took the design first into a laboratory and then to the model shop and then finally to suitable antenna testing ranges where final fine tuning could be performed with proper test equipment. The 'optimized flat plate scalar feed' was the contribution of Howard and it is that optimized model which the pirates always copy. We cannot ever recall seeing a 'pirated Birkill version' and that should tell you something. We hope that sets the record straight for the balance of time.**



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## TRANSPONDER WATCH

## RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

**TRANSPONDER** changes effective as you read this; HBO planned to shut down HBO east (TR24) and Cinemax east (TR23) in favor of feeds on Galaxy 1. New tenants for both transponders will be on line shortly; more 'second level' new or expanded entry cable programmers. WTBS scheduled to begin feeding TR18 on Galaxy 1 but will probably dual feed both F3R and Galaxy 1 for another month or more. Galaxy signal should be appreciably stronger in all areas (TR6 on F3R has been 'ailing' and over-loaded' for nearly two years). SHOWTIME's TR12 (east) and The Movie Channel's TR5 (east) also scheduled a month or more to give cable affiliates time to adapt.

**POSSIBLE** new lease on life for controversial English Unisat high power 12 GHz bird plan. Original plan costs went so high that BBC couldn't afford, even with IBA programmer help. Latest plan would add up to five new program participants.

**LATEST** FCC study of North American transponder loading (4 GHz) is positive; 90 day change reflects nearly 20% increase in video transponders (total now video-dedicated was 114 just in case you want to quote customers an 'accurate' TV channel number in your

ads!). There is a total of 360 C band transponders up there and 145 of these are sitting idle. That, however, is a decrease from the April data.

**TURNER** got quick-reflex FCC permission to carry Soviet 'Friendship Games' directly off of Gorizont at 14 west back in August. CNN asked for permission to carry games 'direct', something never previously permitted. Citisn shortness to create Intelsat link (days) and difference in costs (hundreds of thousands of dollars), CNN/ Turner installed quick 16 foot S/A system with dual-tracking (azimuth and elevation) and standards converter. Pictures seen were not 'great' but they were viewable. Numerous people in 'our industry' could have done it better for Ted.

**AUSTRALIA** having such outstanding pre-launch success 'disposing' of their surplus 12 GHz transponder capacity (two Aussat birds scheduled for launch in 1985) that they are asking that third spacecraft be moved ahead to 1986 launch from original 1988 schedule.

**FAILURE** of U.S. weather satellite, GOES 5 which was 'GOES-EAST' catches US weather satellite program with 'birds down'. Two remaining birds have been re-shuffled with GOES-6 moved to 98

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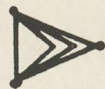
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west. This leaves some blind spots in Pacific, west and NW of Hawaii and in portions of Alaska. Next replacement bird not due until 1986. New Japanese GMS weather satellite recently activated replacing one US firm Hughes helped build; hopes are GMS 3A will not experience failures earlier GMS bird had.

**FORGET** use of TDRSS bird for shooting of special (VOA and other) programs to Europe under sub-contract with present bird manager Systematics General. NASA decided to back off of plan because of conflicts with proposed TDRSS service to existing Intelsat capability to accomplish same goals. How TDRSS 4 GHz capacity will be used, if at all, remains question.

**INTELSAT** and COMSAT (US owner of shares) meanwhile got good raking over in Washington hearings. Issue is whether COMSAT's role in Intelsat precludes private US firms from entering international satellite communications delivery business. Intelsat (Comsat) says it does and says world is better served by present monopoly. Those who would challenge that in free market test (ie. competition) suggest otherwise. US policy in this area, critical to advancement of **private international** bird systems, is hanging in balance. No decision likely prior to national elections.

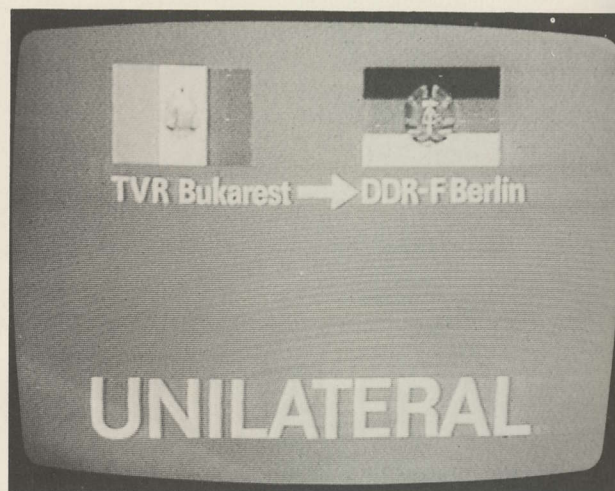
**BRISAT** is another British plan to bring DBS (12 GHz) to UK and some surrounding areas. British Unisat plan has been bogged down in huge cost overruns for nearly one year and teeters on brink of dying, partly because of insistence that UK satellite technology (less than mature) be used in Unisat system. Brisat is alternate, private, proposal that would buy 'standard' (off-the-shelf) US satellite(s) to create UK based 12 GHz DBS.

**'ZAPMAIL'** may become new marketing phrase you will learn to love. Federal Express has made tentative agreement to purchase full 40 transponder capacity on USSI 12 GHz birds scheduled for 134 and 101 west during 1987 launch period. Zapmail would be end to end electronic message/printer service allowing anyone with a terminal to 'zap' a message to anyone else with a terminal in same system at 'speed of light'. Text plus graphics and slow-speed data could be accommodated in theory. Birds are pegged in \$300M region and that's alot of zapping.

**CAMPUS** Conference Network did September 21st 'Clinical Care Of The Elderly' teleconference from Harvard to 21 other campus sites. CCN (not be confused with CNN!) has been planning promotions and this is first of intended widespread use of satellites to link campuses for serious educational pursuits.

**INTELSAT** has created 'Project SHARE' as tool to offer free transponder time to allow satellite interconnection of health care and educational programs to lesser developed 'regions' of the world. 16 month experiment commemorates Intelsat's 20th birthday this fall and it will encourage new, lower cost experiments with both up and down-linking terminal packages.

**BELGIUM** Coronet project (first European based and operated 12 GHz 'open skies' DBS bird) is in some trouble; political. France is primary antagonist working diligently to cancel Coronet before it gets





off ground. Considerable delays in Coronet are likely now; perhaps fatal delays.

**ACTUAL** French use of new Telecom 1A bird (now at 8 west) may not gel for some months. Bird will be joined, according to present plans, by 1B bird early in 1985 at 5 west. French sources verify birds have six 20 watt transponders in 12 GHz band plus 7 GHz downlink for military (Syracuse) network plus six 4 GHz channels on board. The 4 GHz circuits are characterized as 'intended for direct communications to French Overseas Territories'. The 12 GHz channels have been scheduled as follows: Eutelsat (European network) will lease one, Bundespost (German network) 1/4th of another and IBM-France will take another. Another (4 total now) will be used for university tests (campus to campus inter-connection); all on the 8 west member of the family. The 5 west (early '85) member will set aside five of six channels for leasing to 'European TV organizations'; possibly for cable use in Europe. All transponders at 12 GHz are 36 MHz wide with a peak video deviated bandwidth of 25 MHz. Tests indicate a 2.3 meter will deliver 48 dB SNR service with a 365° K front end over all of France, Switzerland, Belgium, Netherlands, UK, northern Italy and as far north as Norway. French sources suggest that with five of six 12 GHz channels available early in 1985 for European cable, there is 'no need' for Belgium Coronet project to go ahead. Coronet plans 16 channels of 12 GHz leased service.

**EGYPT** has spent a sum of money to study the technical and economic feasibility of operating its own (12 GHz) DBS network. Study still underway; no announcements expected soon.

**SWISS** also thinking about their own DBS system. No decision is expected before end of 1985 at earliest.

**NUCLEAR** powered super-giant satellites to be used to broadcast 26 MHz region Voice of America transmissions from Clarke Orbit back to earth being studied by US. Antennas as large as 1,300 feet across (!) would be required in orbit.

**30,000** in-church terminals forecast by Satellite Data, Inc. in program just getting underway. SDI is parent of TVRO manufacturer TX Engineering (BDC receivers). Financing is available; \$300 per month for 48 months to churches.

**SPAIN** wants a piece of the Caribbean/Central/South America satellite program market, proposing launching their own international satellite to be fed from Spain. Primary use would be radio and television programming, to be used terrestrially by Spanish speaking networks in area.

**NASA** projects need for 8 satellite-related Shuttle flights per year by 1990, suggests 'bulge' in new satellite launchings will occur in 1991 with gradual downward trend thereafter. Study forecasts by 1991 most of the available orbital spots will be 'filled' and activity beyond that date will be for replacements or upgraded birds.

**MEDIA** giant Rupert Murdoch (Satellite Television PLC) cable service for Europe) is looking for 'powerful footprint' to get him out of



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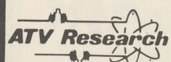


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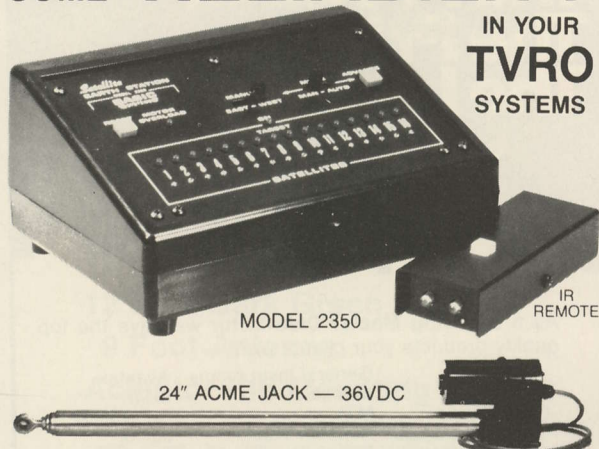
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the cable service signal region. Murdoch appreciates cable service distribution but now has designs on going 'directly to' homes on 12 GHz. Several of the proposed birds in late 80's and early 90's could accommodate him.

**ECS-2** testing at 10 east and will be moved to operational position of 7 east. Transponders available will be used for business distribution services first; spare capacity for additional TV channels (cable).

**NOVEMBER 9th** is scheduled launch date for Ariane (3) flight carrying GTE's SpaceNet 2 bird.

**THAILAND** ready to spend \$1.5M with Hughes for feasibility study leading towards domestic satellite system. Thailand is already leaning towards use of Hughes HS-376 satellite; selected by Australia and Indonesia. Thailand uses leased space on Palapa A-2 bird at 83 east (TBS-7 television on transponder 11) and has 20 'official' TVROs taking feeds from the service.

**WOLD** Communications will dedicate 'Stereo TV Network' this month sending new 'MTS Stereo' service to TV stations users with Wegener Communications 1600 series subcarrier systems.

**SBS-5** bird scheduled for 1986 launch, and under construction, will be switchable 20 or 40 watts per transponder with 8 transponders up to 110 MHz in bandwidth. Bird will be located at 124 west; Ku band.

**U.S.** White House has called for bids on complex fully encrypted terminal at Ku band which is capable of being 'checked as excess baggage' on commercial airliner. System would be forerunner of go-with-the-President satellite 'mobile' command system of the 1990's.

**INTELSAT V**, F7, located at 60 east, has apparently suffered some unspecified failures, possibly in Maritime communications package. Intelsat and builder Ford Aerospace talking with insurance carriers about collecting for loss. Next Intelsat launch will be for first of new series of birds, V-A; scheduled for late this fall via Atlas-Centaur rocket.

**UNIVERSITY** via satellite is goal of National Technological University with Fort Collins, Co. headquarters. Master of Science degrees will be available at tuition of approximately \$1,000 per course subject, to anyone with TVRO. High level project; funding coming from Stanford, USC and MIT.

**COURT** of Appeals in Washington, ruling that 'Any programming service that goes directly to the public should be considered broadcasting' giving new fuel to fires surrounding ultimate legality of TVROs. Concept is that delivery **method** (terrestrial transmission, satellite transmission) is **not** deciding factor; if public has receiving equipment, and if transmission is available to public using that equipment, **'it is broadcasting'**. SPACE delighted with ruling; issue came out of court test of FCC's right to grant DBS licenses and suit was inaugurated by broadcasting industry.

**PAKISTAN** nearing point of full commitment to domestic satellite system; suggests 1986 operational date.

**SKY** Channel, Satellite TV PLC European advertiser service transmitted on ECS-1 (scrambled) for cable, currently averaging 8.5 hours per day; 52.5 percent of program day is from UK program sources with US providing average of 28% of broadcast day/week/month.

**PANASONIC** has introduced a pair of 11.7/12.2 GHz 'low noise' block downconverters; pricing in \$400 range for small quantities (1 to 99).

**INSURANCE** carriers have agreed to underwrite attempt to rescue mis-launched Palapa B2 satellite; probably timing would be during November Shuttle mission.

**ECS-3** (Eutelsat 1-F3) will be moved forward to launch in August of 1985 and will be put into service prior to end of '85, 'exclusively for television program distribution'. Eutelsat had planned number 3-bird as on-ground spare; sees opportunity to get bird into operation to make proposed Coronet 16 channel bird less attractive.

**BELGIAN** cable company ALE of Leige has requested government permission to receive Italian RAI transmissions via ECS bird (see CSD, August 1981; Coop's Comments) for distribution to cable subscribers. This would be first use of RAI outside of Italy for satellite feed.

**BRITISH ITN** (Independent TV News) firm wants to become the CNN of Europe; is studying plan to become DBS user on British DBS bird in late 80's.



**NASA** and **RCA** have signed contract for controversial ACTS (20 GHz down and 30 GHz up) experimental system. Shuttle launch, 1989, is forecast.

**INTELSAT's** board voted to 'move into North American' domestic Clarke-Arc space; is requesting from International Frequency Registration Board (IFRB) in-orbit locations of 16.5, 56 and 60 west. Latter two are inside region set aside for (all) America(s). US has already requested spot at 56 west from IFRB.

**MERCURY** Communications, upstart English firm providing inter-connection from UK to North America (and world) via Intelsat birds, has been totally acquired by semi-privately owned Cable and Wireless firm. Mercury operates lease on transponder 18, Intelsat IV at 1 west carrying feeds for some US networks as well as special events such as tennis for HBO. Cable and Wireless is overseas (from UK) telephone firm with franchises in locations such as Hong Kong.

COOP/ continues from page 6

Seemingly those 'firsts' would pretty well cover most of the early events. But to be complete we need to acknowledge some of the 'firsts' in specific equipment, marketing and legislative areas as well. That goes like this.

**Under antennas**, the first (to):

- 16) Design and prove a petalized (segmented) parabolic dish system for reception from satellites (including television); **Robert Taggart**, Stanford, Ca. 1971.
- 17) Adaptation of flat plate **scalar feed** techniques to 4



**FIRST 6'** (really small!) system was installed by Coop in 1978; antenna and button hook feed by Prodelin. Good pictures from Westar 1.

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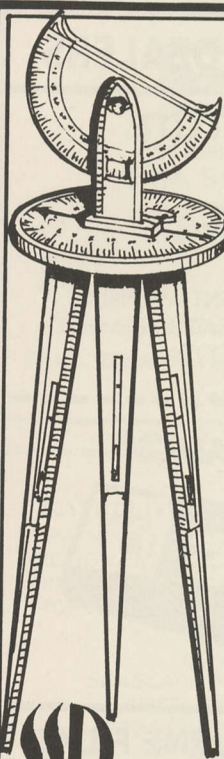
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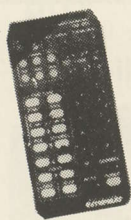
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GHz TVRO; **Steve Birkill**, Sheffield, England (1978; See Correspondence Section, this issue for Taylor Howard letter).

- 18) Polarization **switching** system (mechanical rotation of feed plus LNA); **Bob Cooper**, Arcadia, Ok. (February 1978).
- 19) Do-it-yourself antenna 'kit'; **John Kinik**, San Jose, Ca. (August, 1979).
- 20) Commercial screen-mesh 4 GHz TVRO dish antennas; **USTC**, Afton, Ok. (August, 1979).
- 21) Fiberglass antennas for home TVRO systems; **Randall Odom**, Pocahontas, Ark. (August, 1979).
- 22) Spherical antennas for home TVRO systems; **Oliver Swan**, Bisbee, Arizona (August, 1979).
- 23) Mass produced, volume, home TVRO antenna designed for private use; **Jamie Gowen**, ADM Manufacturing, Poplar Bluff, Mo. (January, 1980).
- 24) Low cost motor drive system for home dish systems; **H & R Communications**, Pocahontas, Ark. (July 1980; \$995).
- 25) Mass produced, precision, high efficiency (scalar) feed systems for 4 GHz; **Chaparral Communications**, San Jose, Ca. (July, 1980).
- 26) Knock-down, transportable TVRO antenna and mount; **Bob Luly**, San Bernadino, Ca. July, 1980).
- 27) Low cost, efficient, **circular-polarized** feed for Intelsat; **Taylor Howard**, San Andreas, Ca. (August, 1980).
- 28) Polarization rotation/switching system all enclosed in feed; in litigation (1981).
- 29) Polarization rotation, **all electronic** non-switching enclosed in feed; **Bob Luly**, San Bernadino, Ca. (August, 1981).

**Under LNAs**, the first (to):

- 30) Build GaAs-FET LNA; **Robert Coleman**, Travelers Rest, SC (April, 1979).
- 31) Design LNAs specifically for the home TVRO marketplace and to price them accordingly; **DEXEL** (June, 1979).
- 32) Offer low cost GaAs-FETs for LNA production; **NEC** (January, 1980; \$50, 1.3 dB noise figure).
- 33) Offer a combination LNA plus downconverter; **DEXEL** (April, 1981).

**Under receivers**, the first (to):

- 34) Design, build (manufacture) and sell **block down-conversion** receivers; **Steve Richey**, SATCO (September, 1978; approximately 50 sold).
- 35) Use a PLL (phase-locked-loop) in the demodulator, resulting in improved receiver sensitivity and reduced costs; **Steve Birkill**, Sheffield, England (1978).
- 36) Build production line **receivers** for home TVRO systems; **International Crystal Manufacturing, Inc.**, Oklahoma City, Oklahoma (August, 1979).
- 37) Offer a TVRO receiver kit to builders, backed with suitable documentation; **H. Paul Shuch**, San Jose, Ca. (August, 1979).
- 38) Build a TVRO receiver with a (wire-line) remote control; **Andy Hatfield** of **AVCOM**, Richmond, Va.



(August, 1979).

- 39) Build and offer a TVRO receiver with a **remote-from-receiver downconverter** in the home TVRO field; **Clyde Washburn**, Rochester, N.Y. (February, 1980).
  - 40) Build and offer TVRO **receivers at under \$1,000** (\$995); **Sat-Tec**, Penfield, NY (June, 1980).
  - 41) Perfect single-conversion, **image reject receiver** design; **David Barker**, Phoenix, Az. (June, 1980).
  - 42) Offer a foreign-made '**import**' TVRO system product; **SATRX**, Honolulu, Hawaii offered a TVRO receiver made in Hong Kong at \$1250 (July, 1980).
  - 43) Offer a TVRO receiver with tuneable audio (all receivers prior had one [6.8 MHz] or two [6.2 MHz] 'fixed-tune' audio systems); **International Crystal Manufacturing, Inc.** model 4300A, \$1149 (July, 1980).
  - 44) Build TVRO receivers in **Canada** and offer them for sale; **ICON** (Winnipeg) and **Comm-Plus** (Montreal) in July, 1980.
  - 45) Offer a TVRO receiver with a **built-in modulator** (previously all modulators were 'outboard' and driven by video and audio from the receiver); **TCI/Telemetry Communications, Inc.**, Pacheco, Ca. (July, 1980; their receiver claimed an output level of +72 dBmV!).
  - 46) Begin mass production of single-conversion, **image-reject** mixer 'low-cost' TVRO receivers; **KLM Skye I** (October, 1980).
  - 47) Demonstrate very **low cost BDC** (block downconversion) techniques; **Keith Anderson**, Blackhawk, SD (May, 1981).
- Under programmers and programming**, the first (to):
- 48) Offer a regular program (weekly) via satellite, explaining and demonstrating low-cost (home, private and cable) reception techniques; **Bob Cooper, Satellite TV Magazine** (October, 1978-December, 1979).
  - 49) Attempt to negotiate **home rights** to Pay TV and other satellite video services: **Gardiner Communications**, and, **Scientific-Atlanta Homesat®** (June, 1979).
  - 50) Premium service to actually solicit and **accept money** from home TVRO owners for programming service to homes; **Star Channel** (now The Movie Channel) at \$96 per year for full home rights with Nickelodeon thrown in as 'free bonus'; program discontinued after 60 days because of cable TV operator complaints (August, 1979).
  - 51) Non-premium service to solicit and accept fees from private (home) TVRO viewers; **ESPN** accepted first \$1.40 and then \$100 for a **lifetime(!)** fee, granting full rights to home viewers. Program discontinued after 90 days because of complaints from cable operators (October-December, 1979).
  - 52) Authorized legal TVRO reception, in a private home, without a mandatory FCC license began **October 18, 1979** after FCC removed all licensing



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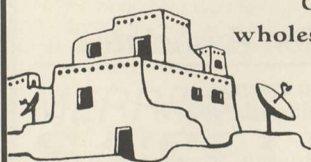
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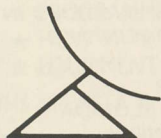
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- 53) North American reception of an **Intelsat** transmission, using home (small antenna) TVRO system equipment; **February 5, 1980** at Miami SPTS (reception from Brazil on Star Antenna 13', Paraframe 16 foot using AVCOM, ICM, H. Paul Shuch receivers).
- 54) North American reception of **Russian** satellite (Molniya); **May 18, 1980** at Arcadia, Oklahoma (using ADM 11' antenna, Birkill scalar feed, Sat-Tec R-1 prototype receiver). **Bob Cooper**.
- 55) Submit a bill to Congress proposing the complete **outlawing** of home TVROs and adding fines up to \$250,000(!!!) for anyone caught using a TVRO to tune-in any 'unauthorized programming'; **HR 7747** (July, 1980).
- 56) Satellite programmer to grant unlimited, no-fee, viewing rights to any and all home TVRO system owners; **CBN/Christian Broadcasting Network** through **CSD Magazine**, September, 1980.  
**Under SPACE** and dealer/distributor activities, the first to:
  - 57) Open a TVRO dealership; John Hastings and Virgil Richardson, **H and R Communications**, Pocahontas, Ark. August, 1979.
  - 58) Propose the acronym **SPACE** and to thereby name the trade association; **Richard L. Brown**, Washington, D.C. (February, 1980).
  - 59) Formal meeting of **SPACE**, selection of officers and the first Board of Directors; San Jose, California (July 4, 1980).
  - 60) Selection of **Taylor Howard** as the First President of **SPACE** (July 4, 1980).  
**And finally**, in the we can't think of a category; the first:
    - 61) Person to coin the phrase '**sparklie**' (or sparkle although the man actually said 'sparklie'); **Cliff Schrock**, an engineer with Tektronics, Beaverton, Oregon; July, 1977.
    - 62) Broadcast a satellite TV signal out over the air using an **unlicensed** transmitter; **Faro, Yukon**, Canada, February, 1978 (**Rod Wheeler**).
    - 63) Commercially installed, home satellite terminal for a private party; **Bell Ranch**, outside of Tucumcari, New Mexico (installed by **Scientific-Atlanta**) in July of 1979.
    - 64) TVRO publication; **CSD** off the presses September 28, 1979 (dated October).
    - 65) Appearance of satellite TV transmitted programs in **regular edition** of **TV GUIDE** Magazine (New York City edition, others; December, 1979).
    - 66) Appearance of specialized program guide for satellite TV programming (and TVRO users); **SatGuide**, Hailey, Idaho (February, 1980).
    - 67) Surfacing of a fraudulent supplier in the home TVRO field; **Cascade Electronics** (Microwave), Oregon (June, 1980).

Now, you have 11 months or so to pick this 'First of Firsts' list apart and provide me with the documentation



that will result in an updated and hopefully final version one year hence. **Happy remembering!**

### REFLECTIONS On Pioneers

Spotting significant events in the history of our young industry which have helped turn the tide one direction or another is tougher than it may first seem. People who are too close to a singular event are often misguided about how that event actually impacted the trends that followed. Those who try to dig through the old literature (mostly written by me, unfortunately) must somehow sift through the bias(es) of the writer to find the 'truth'.

In selecting the seven founding Pioneers (or "Pioneer's Pioneer" honorees) for the September 3rd Birthday Party in Nashville, there was one event I kept stumbling over which I felt had made a significant difference in the years that followed. At one point the person responsible for that event was **on** the 'original seven list' and then he fell off as I rethought out some of the contributions of those in the 8 and down positions. I'd like to share my thoughts on this person and event with you now.

His name is **David Wolford** and those who read magazines carefully must be aware that David is the publisher for a long list of publications including the bigger-than life **Orbit** program guide. Wolford came into our lives from the cable industry; he was operating some modest sized cable properties in Idaho when he was introduced to a larger sized cable operator from Texas. This was in an era (1975-1979) when cable firms were gobbling each other up; the big guys were buying the smaller guys using leveraged stock, deeds to condos in Hawaii and as a last resort, cash money. You could sell a cable property for between \$300 and \$600 per cable home connected in those days. Wolford had several thousand cable homes connected.

When he sold out, he was nervous; his energy level was high and his bank account was full. He was still young and he wanted to do something new and exciting. He was not ready to retire to a beach someplace.

We talked about the new home TVRO world several times. He was one of the very (very) first to have a home terminal and he knew it was going to go someplace. Neither of us knew where, or how fast, at the time.

**All of this is trivia** and is likely to be forgotten because the contribution of Wolford may eventually transcend the contributions of virtually everyone else on our original list of seven excepting of course **Arthur C. Clarke**.

Wolford took some of that cable money and he gambled it on starting a new publication. He faced stiff odds. The publication (still around and called **SatGuide**) attempted to publish, in **TV Guide** format, all of the monthly program listings for all of the then available cable TV services found on F2. There were twenty such services in those days. When Wolford started **SatGuide**, **TV Guide** had just begun to carry HBO and Showtime listings for a few of the regional editions. WTBS made it

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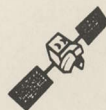
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to some out-of-the-way regional editions (such as New Mexico) because of the heavy influence of cable. TV Guide allowed satellite services in, after the first breakthrough late in 1979, only when they 'measured' sufficient cable penetration of the satellite signals to justify, in their minds, giving up valuable page space to the likes of Ted Turner.

**Wolford promptly ran into problems** getting the listings. A service that today routinely provides 'computerized listings' would sell to him alright, but they had not gotten into computerizing **all** of the new satellite services yet. So SatGuide had to patch and fill with guides obtained directly from the services. That's where the rub started; the services saw that Wolford was publishing a 20 channel satellite guide, and **they knew** it was going to be used by those new crazies; "Home TVRO Owners". Since the cable services were not friendly with the concept of home TVROs, the last thing they wanted to do was to cooperate with some guy in Idaho who was feeding their 'illegal addiction' with printed guides!

Wolford worked it all out, and stayed in business, and that's where the real contribution began. He adopted a marketing technique which put SatGuide in front of every would-be dealer and tens of thousands of would-be TVRO owners. The dealers used SatGuide as a 'tool' to sell TVROs ("**look here . . . see all of the programs you can get with this dish?**"). There is no accurate way to measure how many thousands of new terminals SatGuide started the clock ticking on, but it has been a big number through the years.

His technique worked so well that his magazine prospered and grew by leaps and bounds. When a late-starter brought out a weekly newspaper-format guide (**Satellite TV Week**) in the fall of 1981, the Wolford marketing concept was taken a step further; "Week's" publishers decided to offer a free guide to TVRO receiver suppliers and antenna suppliers to be **packed in with** the products. That gave the dealer a guide to hand directly to customers when the system was installed, and of course the new TVRO owner usually responded by firing off his subscription.

Wolford is no Saint but that same thing could be said for several others in the Pioneer group. **What he has been to the industry** is a champion of healthy growth, a usually fearless and often outspoken advocate of running a clean, tight ship, and a promoter of exporting American TVRO technology to the entire world from the very first day.

I am not sure how the next round of Pioneer selections will go, or even if the program will carry forth. I hope, however, that if it does mature we will see **David G. Wolford** of Hailey, Idaho receiving formal recognition for his contribution in our founding years. Many of you would not be in this business today if Wolford had not pioneered consumer guide publishing in this field back in the first months of 1980. I'd give almost anything if I could locate that first edition of SatGuide I once had in my files. It was, truly, **the start of something big!**



# SUPER FEEDS



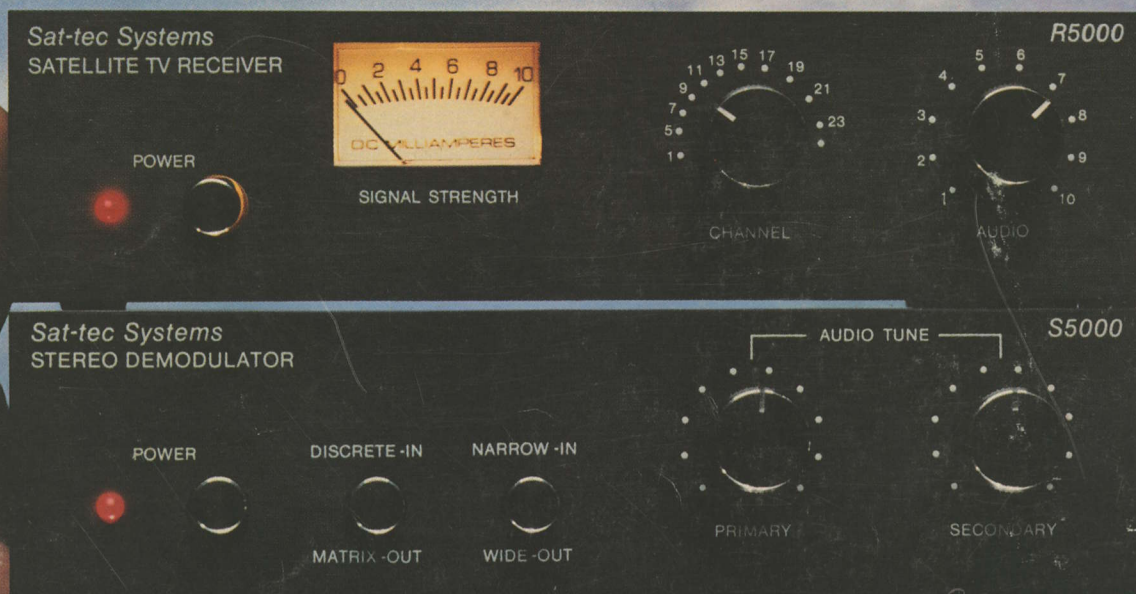
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